

Service Manual

PIONEER
The Art of Entertainment

• DEH-M990RDS/EW



ORDER NO.
CRT1513

MULTI-CD CONTROL HIGH POWER DSP CD PLAYER WITH RDS TUNER

DEH-M990RDS

EW

MULTI-CD CONTROL HIGH POWER DSP CD PLAYER WITH FM/AM TUNER

DEH-M990DSP

UC

DEH-M970DSP

ES

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COMPACT
disc
DIGITAL AUDIO

- See the service manual DEH-M980/UC (CRT1450) for the CD mechanism description and circuit description.

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- **CD Player Service Precautions**

1. For pickup unit (CGY1020) handling, please refer to "Disassembly" (Fig. 7) During replacement, handling precautions shall be taken to prevent an electrostatic discharge (protection by a short pin).
2. During disassembly, be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.

SAFETY INFORMATION (UC MODEL)

CAUTION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.

Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5). When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

SAFETY INFORMATION (EW MODEL)

1. Safety Precautions for those who Service this Unit.

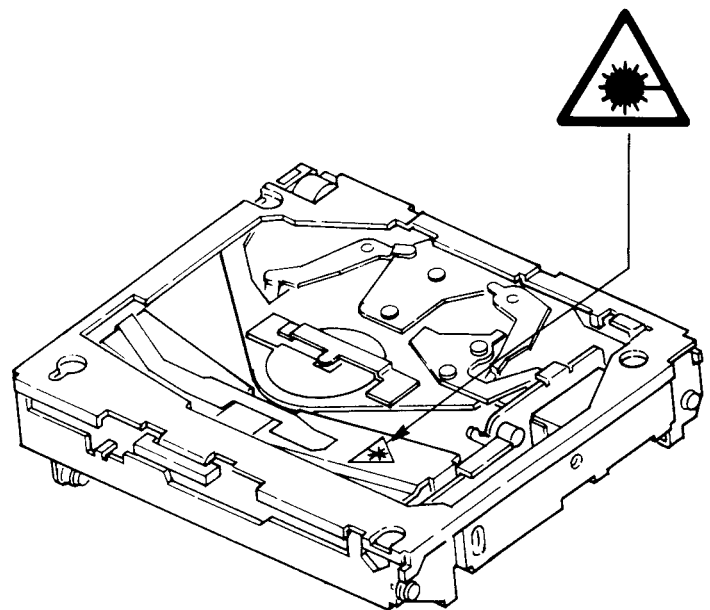
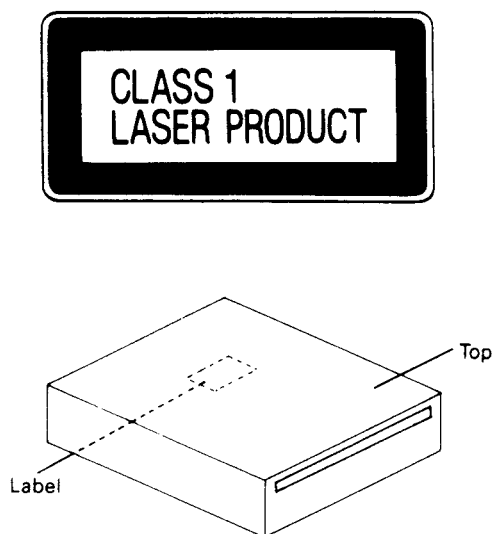
- Follow the adjustment steps (see pages 20 through 36) in the service manual when servicing this unit. When checking or adjusting the emitting power of the laser diode exercise caution in order to get safe, reliable results.

Caution:

- During repair or tests, minimum distance of 13cm from the focus lens must be kept.
- During repair or tests, do not view laser beam for 10 seconds or longer.

2. A "CLASS 1 LASER PRODUCT" label is affixed to the bottom of the player.

3. The triangular label is attached to the mechanism unit arm unit.



4. Specifications of Laser Diode

Specifications of laser radiation fields to which human access is possible during service.

- | | |
|---------------|--|
| Wavelength | = 785 nanometers |
| Radiant power | = 69.7 microwatts |
| | (Through a circular aperture stop having a diameter of 80 millimeters) |
| | 0.55 microwatts |
| | (Through a circular aperture stop having a diameter of 7 millimeters) |

1. SPECIFICATIONS

●DEH-M990RDS

General

Power source	14.4 V DC (10.8 — 15.6 V allowable)
Grounding system	Negative type
Max. current consumption	10.0 A
Dimensions (chassis)	180 (W) × 50 (H) × 150 (D) mm
(front face)	188 (W) × 58 (H) × 20 (D) mm
Weight	1.7 kg

Amplifier

Max. power output.....	30 W × 4 (EIAJ)
Continuous power output.....	14 W × 4
	(1% dist. at 1 kHz)
Load impedance.....	4Ω (4 — 8Ω allowable)
Preout output level/ output impedance.....	500 mV/1 kΩ
Tone controls (parametric) by DSP	
(Bass) Frequency	63 Hz, 100 Hz, 160 Hz
(Treble) Frequency.....	6.3 kHz, 10 kHz, 16 kHz
Equalization range	±12 dB
Equalizer (3 band parametric) by DSP	
Frequency.....	20 Hz, 25 Hz, 31.5 Hz, 40 Hz, 50 Hz, 63 Hz, 80 Hz, 100 Hz, 125 Hz, 160 Hz, 200 Hz, 250 Hz, 315 Hz, 400 Hz, 500 Hz, 630 Hz, 800 Hz, 1 kHz, 1.25 kHz, 1.6 kHz, 2 kHz, 2.5 kHz, 3.15 kHz, 4 kHz, 5 kHz, 6.3 kHz, 8 kHz, 10 kHz, 12.5 kHz, 16 kHz, 20 kHz
Equalization range	±12 dB
Loudness contour	+10 dB (100 Hz), +6.5 dB (10 kHz)
	(volume: -30 dB)

CD player

System.....	Compact disc audio system
Usable discs.....	Compact disc
Signal format	Sampling frequency: 44.1 kHz
	Number of quantization bits: 16; linear
Frequency characteristics.....	5 — 20,000 Hz (± 1 dB)
Signal-to-noise ratio	94 dB (1 kHz) (IEC-A network)
Dynamic range.....	90 dB (1 kHz)
Number of channels	2 (stereo)

FM tuner

Frequency range	87.5 — 108 MHz
Usable sensitivity	8 dBf (0.7 μ V/75 Ω , mono, S/N: 30 dB)
50 dB quieting sensitivity	13 dBf (1.2 μ V/75 Ω , mono)
Signal-to-noise ratio	70 dB (IEC-A-network)
Distortion	0.3% (at 65 dBf, 1 kHz, stereo)
Frequency response	30 — 15,000 Hz (\pm 3 dB)
Stereo separation	40 dB (at 65 dBf, 1 kHz)

MW tuner

Frequency range..... 531 — 1,602 kHz
Usable sensitivity..... 18µV (25 dB) (S/N: 20 dB)
Selectivity..... 50 dB (±9 kHz)

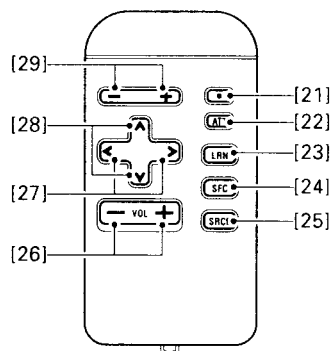
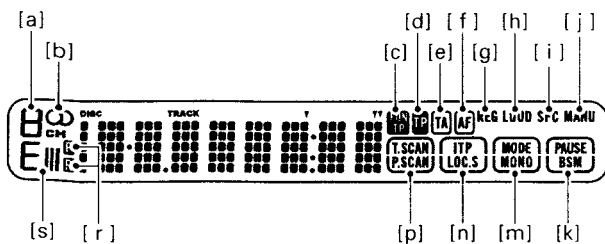
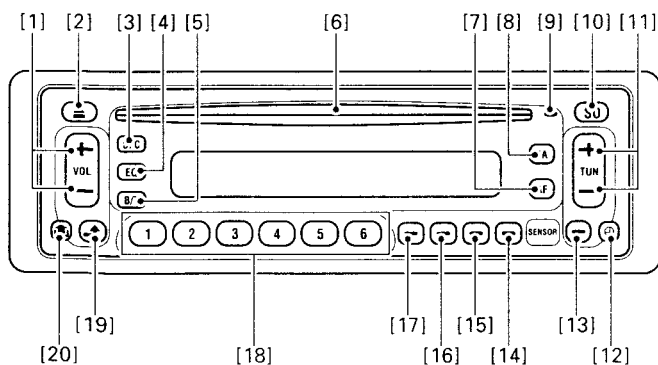
LW tuner

Frequency range	153 — 281 kHz
Usable sensitivity	30µV (30 dB) (S/N: 20 dB)
Selectivity	50 dB (+9 kHz)

Note:

Specifications and the design are subject to possible modification without notice due to improvements.

2. OPERATION AND CONNECTION



Adjusting the Audio

Parts Identification

- [1] Volume
 - Fader/Balance
 - Listening position
 - Level
 - Tone curve
- [3] SFC mode
 - Loudness
- [3] + [19] Self-Demonstration mode
- [4] Parametric Equalizer mode
- [4] + [5] Listening position mode
- [5] Parametric Bass/Treble mode
- [11] Frequency
- [13] Defeat
 - Forced Flat
- [18] 1 = Equalizer Low band
 - 2 = Equalizer Mid band
 - 3 = Equalizer High band
 - 4/5/6 = Tone memory
- [19] Fader/Balance mode
 - SLA mode
- [22] Attenuator
- [h] Loudness
- [i] SFC
- [r] Front/Rear

Adjusting the Volume

Press button [1].

- ▶ Adjust the volume so that the outside environment can still be audible.

+	Up	"VOL 30"
-	Down	"VOL 00"

Adjusting the Fader and Balance

1. Set the fader or balance mode with button [19]. Each time the button is pressed, the mode will change in the following sequence:
 - Volume "VOL 12" — Fader "FAD 0" — Balance "BAL 0"
 - The volume, fader or balance mode will be canceled after about 8 seconds.
2. Adjust the fader and balance while in their respective mode. Press button [1].

Fader

+	Front	"FAD F9"
-	Rear	"FAD R9"

- For a 2-speaker system, set to "FAD 0".

Balance

+	Left	"BAL L9"
-	Right	"BAL R9"

Using the Source Level Adjuster (SLA)

This is to adjust the difference in volume when the source is changed to built-in CD player, multi-play CD player, FM, or MW/LW.

- Since the FM volume will be the standard volume, it cannot be adjusted.
1. Check the FM volume.
 2. Switch to the source whose volume is to be adjusted. Check the source's difference in volume with the FM volume.
 - Do the adjustment for each source: built-in CD player, multi-play CD player, and MW/LW.
 3. Set to SLA mode. Press button [19] for at least 2 seconds. (The current level of "V 0" will be displayed.)
 - The SLA mode will be canceled after 8 seconds.
 4. Adjust the difference in volume. Press button [1].

+	Up	"V +4"
-	Down	"V -4"

Attenuator

The volume will be reduced to about 1/10. Press button [22]. ("ATT 12" will blink.) To cancel, press the button again.

- This function can be used only with the remote control unit.
- While the attenuator is ON, audio adjustments (except the volume) cannot be adjusted.

Using the Sound Field Control (SFC)

SFC Features

The SFC (Sound Field Control) is a feature which gives various sound fields such as echo, reverberation, etc., using the built-in DSP (Digital Signal Processor) circuit. The SFC can be set to give the following four sound field programs:

STUDIO: Reproduces a sound field with little reverberation like in a mixing room or recording studio.

JAZZCLUB: Gives the sound effect found in jazz clubs and live houses.

HALL: Reproduces the acoustics of a classical concert hall seating 1,000 to 2,000 people.

STADIUM: Gives the effect of a live performance in an outdoor stadium.

- The effects of SFC are more prominent in the front speakers rather than in the rear speakers. For a 2-speaker system, use the front speakers.
- SFC function will not operate when the traffic report is being received.

Listening Position Setting

The distance from the front, rear, left, and right speakers will differ depending on where you are seated in the car. Therefore, the SFC effects will also change depending on where you are seated.

The optimum listening position for the SFC can be set to the left front seat or to the right front seat, wherever the driver's seat is. (The initial setting is for the left front seat.)

- Some car models and speaker positions may reverse the SFC's optimum listening position.

1. Set to listening position mode. Press buttons [4] and [5] simultaneously.
 - The listening position mode will be canceled after 8 seconds.
2. Change the listening position by pressing button [1].

+	Left side	"L-SIDE"
-	Right side	"R-SIDE"

Sound Field Program Selection

1. Set to sound field program selection mode by pressing button [3]. (The current sound field program will be displayed.)
 - When button [3] is pressed while SFC is OFF, the sound field program selection mode will be set and SFC will be ON with STUDIO selected.
 - When SFC is ON and one of the sound field programs is selected, "SFC" [i] will be displayed.
 - The sound field program selection mode will be canceled after about 8 seconds.
2. Select the sound field program with button [3]. Each time the button is pressed, the sound field program will change in the following sequence:
 - STUDIO — JAZZCLUB — HALL — STADIUM — SFC OFF (cancels the sound field program selection mode)

Using the Parametric Bass and Treble

Mode Selection

The bass and treble can be adjusted for the front and rear speakers simultaneously with the "simultaneous adjustment mode" or separately with the "independent adjustment mode". Select either mode.

1. Set to bass/treble mode by pressing button [5]. (The current bass/treble curve and front/rear [r] will be displayed.)

- When both "F" and "R" are displayed at [r], it indicates the "simultaneous adjustment mode". When only "F" is displayed, it indicates the "independent adjustment mode".
- The bass/treble mode will be canceled after about 8 seconds.

2. Change the mode by pressing button [5] for at least 2 seconds. Each time the button is pressed, the mode will switch between the "simultaneous adjustment mode" and "independent adjustment mode".

- When the mode is changed from the "independent adjustment mode" to the "simultaneous adjustment mode", the bass/treble level set with the "independent adjustment mode" will be canceled and reset to 0 (flat).

Adjusting the Bass/Treble

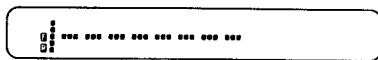
1. Set to bass/treble mode by pressing button [5].

- The bass/treble mode will be canceled after about 8 seconds.

Each time the button [5] is pressed, the mode will change in the sequence below. Adjust each mode accordingly.

1-A. Simultaneous adjustment mode

Bass/treble curve display



Bass adjustment mode



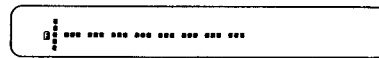
Treble adjustment mode



Bass/treble curve display

1-B. Independent adjustment mode

Front bass/treble curve display



Front bass adjustment mode



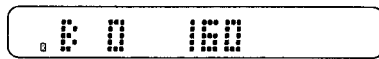
Front treble adjustment mode



Rear bass/treble curve display



Rear bass adjustment mode



Rear treble adjustment mode



Front bass/treble curve display

2. Adjust the frequency and level in the respective mode.

2-1. Frequency selection

Three level adjustment frequencies can be selected for the bass and treble:

Bass : 63 Hz, 100 Hz, 160 Hz

Treble: 6.3 kHz, 10 kHz, 16 kHz

Press button [11].

Bass

+	Up	"160"
-	Down	"100"
		"63"

Treble

+	Up	"16.0 k"
-	Down	"10.0 k"
		"6.3 k"

2-2. Level adjustment

Press button [11].

Bass

+	Up	"B+6"
-	Down	"B-6"

Treble

+	Up	"T+6"
-	Down	"T-6"

Using the Parametric Equalizer

To adjust the level, three bands "Low", "Mid", and "High" can be selected for the frequencies between 20 Hz and 20 kHz.

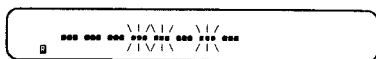
- The frequency can be selected at 1/3 octave steps (20, 25, 31.5, 40 ... 10 k, 12.5 k, 16 k, 20 kHz) from 20 Hz to 20 kHz.
- For "Low", only a frequency lower than "Mid" can be selected. And for "Mid", only a frequency lower than "High" can be selected.
- For "Low", "Mid", and "High", the frequency cannot be set in steps smaller than one octave. (Ex.: When "Mid" is set to 500 Hz, "Low" can only be set to 250 Hz or lower and "High" can only be set to 1 kHz or higher.)

1. Set to equalizer mode by pressing button [4]. Each time the button is pressed, it will switch between the front equalizer mode and the rear equalizer mode. Adjust accordingly in the respective mode.

Front equalizer mode



Rear equalizer mode



- The equalizer mode will be canceled after about 8 seconds.
- The curve display's blinking portion will indicate the position of "Low", "Mid", and "High".

2. Select the band to be adjusted.

Select either "Low", "Mid", or "High". Press button "1" [18] to select "Low", press "2" to select "Mid", or press "3" to select "High". The respective adjustment mode will be set.

3. Adjust the frequency and level in the respective adjustment mode.

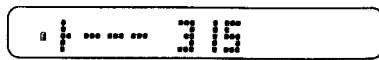
Also, in the adjustment mode, the curve display or the level display can be selected. Select the desired display.

3-1. Changing the display

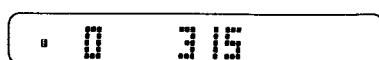
Press button [4] for at least 2 seconds.

Repeat this operation to switch between the curve display and level display.

Curve display



Level display



3-2. Frequency selection

Press button [11].

Ex.: "Low" band

+	Up	"5.0 k" to "20"
-	Down	

3-3. Level adjustment

Press button [1].

Ex.: Level display

+	Up	"+6" to "-6"
-	Down	

- The band selection, frequency selection, and level adjustment of the parametric equalizer can be done by the remote control unit.

Tone Curve Display

The overall tone curve for the current bass/treble and equalizer setting can be displayed.

Press the (+) and (-) sides of button [1] simultaneously. Each time this is done, the display will change in the following sequence:

Front tone curve — Rear tone curve — Cancel

- The tone curve will be canceled after about 8 seconds.

Tone Memory Function

Three different tone settings (overall curve for bass/treble and equalizer) can be stored by pressing buttons "4", "5", and "6" [18].

Storing into Memory

- Set to bass/treble mode, the equalizer mode or tone curve display.
- Store in memory as follows:
 - To store the tone setting under the "4" or "5" button [18], press the "4" or "5" button for at least 2 seconds until there is a beep.
The current tone setting will be stored in memory under the button that was pressed.
 - To store the tone setting under the "6" button [18], press the "6" button and for at least 5 seconds until there is a beep.
The current tone setting will then be stored in memory under the "6" button.
 - Storing the tone setting under the "6" button takes longer than the "4" and "5" buttons. Therefore, storing a tone setting by mistake can be more easily avoided. Storing your favorite tone setting under button "6" is recommended.

Recalling Memory

- Set to bass/treble mode, the equalizer mode or tone curve display.
- Recall the tone setting by pressing "4", "5", or "6". The tone setting stored under the button pressed will be recalled.

Defeat Function

When the Defeat function is turned ON, the tone setting (overall curve for bass/treble and equalizer) will be flat. When the Defeat function is turned OFF, the tone setting will be restored.

This function is convenient to check the effect of the tone setting.

- Set to bass/treble mode, the equalizer mode or tone curve display.
- Turn on the Defeat function by pressing button [13]. ("-----" will blink.)
To cancel, press the button again.

Forced Flat Function

The tone setting (overall curve of bass/treble and equalizer) can be reset to the flat tone.

This function is convenient to start over from the flat tone when setting the tone.

- Set to bass/treble mode, the equalizer mode or tone curve display.
- Set the tone to the flat tone by pressing button [13] for at least 2 seconds until there is a beep. The tone setting (overall curve for bass/treble and equalizer) will be reset to the flat tone.

Loudness Function

When the volume is low, the loudness function compensates for the insufficient bass and treble.

Press button [3] for at least 2 seconds. ("LOUD" [h] will be displayed.)

To cancel, press the button again in the same way.

Self-Demonstration Function

When the unit's power is OFF, pressing button [3] and [19] simultaneously will automatically turn the unit's power ON. The self-demonstration mode will start to demonstrate the audio function, such as parametric equalizer and sound field control.

To cancel, press any button on this unit or on the remote control unit.

Using the Tuner

Parts Identification

- [7] AF
- REG
- [8] TA
- EON
- [10] Source
- [11] Tuning
 - Seek/Manual
 - Local Seek Sensitivity
 - Tuning Step
- [13] Band
- [14] BSM
- [15] FM Monaural
 - Frequency Display
- [16] Local mode
 - Local Seek Sensitivity Adjustment
 - mode
- [17] Preset Scan
- [18] Preset
 - [a] Preset Number
 - [b] FM Stereo
 - [c] EON
 - [d] TP
 - [e] TA
 - [f] AF
 - [g] REG
 - [j] Manual
 - [k] BSM
 - [m] FM Monaural
 - [n] Local mode
 - [p] Preset Scan
 - [s] FM 1,2,3

Electronic Tuner

Frequency allocation differs depending upon the area. This unit has been designed in accordance with the frequency allocations for Western Europe, Asia, the Middle and Near East, Africa, Australia and Oceania. Use in other areas may result in improper reception of AM. The RDS function does not work in regions with no RDS broadcast services.

Listening to the Radio

1. Set the source to "tuner" by pressing button [10].
2. Select the band by pressing button [13]. Each time the button is pressed, the band will change in the following sequence: FM1 — FM2 — FM3 — MW/LW
 - MW and LW are combined in one band.
3. Use seek tuning or manual tuning to tune to a radio station.
- 3-1. Set the tuning mode to "seek" or "manual" by pressing the (+) and (–) sides of button [11] simultaneously. Repeat this operation to switch to the other tuning mode. (When the manual tuning mode is set, "MANU" [j] will be displayed.)

- 3-2. Tune by pressing button [11]. (When there is a stereo broadcast, "S" [b] will be displayed.)

Ex.: FM band

+	Up	"FM 108.00" to
–	Down	"FM 87.50"

Seek Tuning: When the button is pressed, stations whose signal strength is above a certain level will be tuned automatically.

Manual Tuning: When the button is pressed, the frequency will change by one step up or down.

- Hold down the button to change the frequency continuously.

Using the Preset Memory

The radio stations can be stored in memory under buttons 1 to 6 of [18]. (See Parts Identification.)

1. Tune in to the station to be stored in memory.
2. Store the station in memory by pressing one of the buttons (1 to 6) for at least 2 seconds. When the [a] number stops blinking and there is a beep, the station will be stored in memory under the button pressed.
 - Up to 18 FM stations (6 stations each for FM 1, 2, and 3) and 6 MW/LW stations can be stored in memory.

Preset Tuning

The radio stations stored in memory can be recalled by pressing the respective button 1 to 6 of [18]. The station stored under that button will be recalled. (The number of the button pressed will be displayed at [a].)

Using the Best Stations Memory (BSM)

The radio stations having a strong signal can be tuned automatically and stored in memory under buttons 1 to 6 [18]. Press button [14] for at least 2 seconds. (The "BSM" [k] frame will light and "BSM" will blink.) After "BSM" stops blinking, the stations will be stored in memory under buttons 1 to 6 of [18].

- BSM can be canceled mid-operation by pressing button [14].
- The stations will be stored under buttons 1 to 6 in the order of their signal strength. The strongest station will be stored under button 1, followed by stations with lower signal strengths.
- If there are fewer than 6 stations whose signal is strong, there will be spare memory.
- It will take almost 30 seconds for BSM to be completed.

Preset Scan Tuning

This recalls in sequence all the stations stored in memory under the buttons [18] for 8 seconds each. Press button [17]. (The "P.SCAN" [p] frame will light and the [a] number will blink.) To cancel, press the button again. After the desired station is tuned, cancel the preset scan tuning. The station will then continue to be received.

- Stations stored in memory under the buttons [18] but whose signal is weak will not be recalled.

Local Seek Tuning

When the local mode is set, the seek tuning's sensitivity level will become high and only stations with a strong signal will be seek tuned. The local mode's seek sensitivity can be adjusted.

Setting the Local Mode

Press button [16]. (The "LOC.S" [n] frame will light.) To cancel the local mode, press the button again.

Adjusting the Local Seek Sensitivity

There are 4 local seek sensitivity steps (LOC-1 to LOC-4) for FM and 2 steps (LOC-1 and LOC-2) for MW/LW.

- LOC-4 is the highest seek tuning sensitivity level. Only the stations with a strong signal are tuned. LOC-3, LOC-2, and LOC-1 in descending order enables the tuning of stations with a respectively weaker signal.

1. Set to local seek sensitivity adjustment mode. Press button [16] for at least 2 seconds. (The current sensitivity level "LOC-2" will be displayed.)
 - The local seek sensitivity adjustment mode will be canceled after about 5 seconds.
2. Adjust the sensitivity level by pressing button [11].

Ex.: FM band

+	Level Up	"LOC-4" to
–	Level Down	"LOC-1"

FM Monaural Reception

If a stereo broadcast has a lot of noise, switching to the monaural reception mode will reduce the noise. Press button [15]. (The "MONO" [m] frame will light.) To cancel, press the button again.

Using the RDS Function

What is RDS?

RDS (Radio Data System) according to a CENELEC EN50067 is a system for transmitting data signals from FM broadcast transmitter along with the normal sound program. These data signals, which are imperceptible to listeners, are intended to aid radio listeners in tuning their receivers to a desired station. RDS receivers can decode these data signals for display or control purposes.

RDS digital signal includes various data, such as PI, PS, AF, TP, TA and EON.

PI.....	Program Identification Code
PS	Program Service Name
AF	List of Alternative Frequencies
TP.....	Traffic Program Identification Code (Similar to SK signal of ARI system)
TA	Traffic Announcement Code (Similar to DK signal of ARI system)
EON	Enhanced Other Network Information Code (In some countries. EON is not offered by broadcasters.)

Alternative Frequency Function

To activate the Alternative Frequency Function, press button [7], "AF" [f] will appear on the display. Once tuned to a RDS station, as long as you drive within an area served by the same network, the receiver will automatically retune to a more suitable station transmitting the same program, by utilizing the PI code and AF list data.

- "PI SEEK" will appear on the display, if the AF function has been selected, and a suitable AF station cannot be found. In this case, the receiver will mute the radio sound and search the frequency band, in order to find a station with the same PI code. The receiver will return to the original frequency if a suitable PI code can not be found.
- **The AF function will not work in the following cases:**
 - when the receiver is tuned to a non-RDS station.
 - when the RDS station does not transmit any AF list data.
 - when the receiver can not receive the AF list data for some reason.

In all of these cases, "AF" [f] will flash on the display to indicate the AF function is unable to function.

- If button [7] is pressed before selecting a preset RDS station in memory, the Alternative Frequency Function operates when the preset station is being recalled.

RDS Function of this Unit

This unit has the following functions for making use of RDS data.

- PS, the name of the currently listened station is displayed.
- AF (Alternative Frequency) function. This enables the receiver to automatically retune to more suitable frequencies transmitting the same program.
- TP/TA, EON, user selectable reception of the traffic information service, offered by RDS.

Network/Station Name Display

Switch the tuner on and choose one of the three FM bands.

When you tune into an RDS station with manual or seek tuning, the frequency display changes to the network/station name display after a few seconds by means of the PS code.

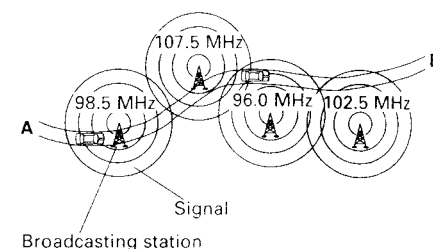
- The RDS functions of this unit use RDS codes transmitted along with FM broadcasts. RDS doesn't work on the MW or LW bands.
- The RDS functions may not work properly in areas where the RDS transmissions are at an experimental stage or where there are flaws in the broadcasting system.
- Hold down button [15] for more than 2 seconds to change the network/station name display to a frequency display. The frequency will be displayed while the button is being held down.

AF (Alternative Frequency) Function

This receiver retunes automatically to a more suitable transmitter, contained in the list of Alternative Frequencies (AF), to enable the motorist to keep listening to programs in the same network.

Example:

If a motorist travels as shown below, from point A to point B, (and has selected AF function) then the receiver will automatically retune to a more suitable frequency transmitting the same program. This is shown by the automatic retuning from 98.5 MHz to 107.5 MHz to 96.0 MHz to 102.5 MHz.



- During the day, some radio stations may broadcast regional programs which are different from those broadcasted by other stations within the same network. If the receiver is tuned in to such a regional program and you wish to continue listening to it, hold down button [7] for more than 2 seconds, to select the regional function. "REG" [g] will appear on the display. Using the AF Regional function, the receiver will tune automatically to those stations broadcasting the same regional program. However, there are cases where some stations do not contain the required AF list data for this function to work. (This is not a malfunction of the unit.) Hold down button [7] again for more than 2 seconds to cancel the regional function. "REG" [g] will go off.
- If the receiver is set to FM beforehand, and the main unit's built-in CD player or the multi-play CD player is being listened to, pressing down button [7] will illuminate "AF" [f] and allow the AF function to work. However the radio sound will remain muted.

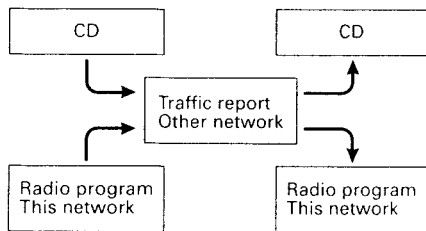
Traffic Information Reception

When a traffic information station (TP or SK station) is selected, "TP" [d] lights on the display, thus indicating traffic report can be received through this station. The "EON TP" [c] indicator will light on the display when a selected station (this network) is broadcasting EON information which cross-references at least one program service which carries traffic information, thus indicating traffic report can be received through another program service (other network) by using the EON function of this unit.

In both cases, by briefly pressing button TA [8], Traffic report waiting status will be entered. However, if you wish not to interrupt your radio program (eg: classical music program) by traffic report but wish to receive traffic report only from traffic information station by selecting it, the EON function of this unit can be set to OFF. Pressing button TA [8] for more than 2 seconds, changes the status of the EON function, EON-ON \rightleftharpoons EON-OFF.

This indication is shown on the display for approximately 3 seconds. If only the "EON TP" [c] indicator is on but the EON function of this unit is OFF, it is not possible to receive traffic report through another program service. In this case, "TA" [e] (if traffic report waiting status is set to ON) will flash on the display to indicate this situation.

Traffic information reception by EON function.
When "EON TP" [c] and "TA" [e] light.



- The volume of the traffic report reception can be adjusted during the reception of a traffic report. The next time that a report is received, the volume will be at the previous setting. However, if the preset volume of the traffic reception is below that of the present source, the volume of the traffic reception will not decrease, and the preset volume of the traffic reception will be set to that of the source.
- If the radio band is already set to the FM band, even when listening to the CD player or the multi-play CD player, when the button [8] is pushed ("TA" [e] is shown on the display), the radio will be powered on, and traffic report waiting will begin. When a traffic report begins, the system will switch the sound source from the CD to the traffic report.

- While the button [8] is on, ("TA" [e] is shown on the display), and you are listening to either the CD or multi-play CD player, should the traffic report station broadcast become weak, the radio will start BSA (Best TP or SK Station Auto Search) 10 seconds after "TP" [d] disappears from the display. The tuner will tune to the strongest TP or SK station, and will stand by for a traffic bulletin. BSA does not work when the AF function is selected, so turn off button [7] when you want to use BSA.
- About 30 seconds after "TP" [d] disappears from the display, which occurs if the signal from the TP or SK station becomes weak, an alarm sounds for 10 seconds to tell you to tune to another TP or SK station.

Tuning Functions on each RDS modes

Seek Tuning will stop to find,

AF Mode	TA Mode & AF plus TA Mode
RDS Stations	TP or SK Stations

BSM will select and memorize in presets,

AF Mode	TA Mode & AF plus TA Mode
RDS Stations	TP or SK Stations

Non-RDS station such as those using the Swedish MBS system may be tuned in as RDS station, but this is due to both systems using the same 57 kHz subcarrier frequency and is not a malfunction of the unit.

Tuning Steps

The tuning step is normally 50 kHz during seek tuning on an FM band. This tuning step changes to 100 kHz during AF reception or traffic report reception. If desired, you may set a tuning step of 50 kHz for AF reception or traffic report reception by holding down the (+) side of the button [11] while turning the ignition key from OFF to ON.

- During manual tuning, the step does not change; it remains fixed at 50 kHz.
- The tuning step will return to 100 kHz if the batteries supply is temporarily disconnected or the clear button is pressed.
- When the AF reception function is on, only those stations being broadcast at 100 kHz steps are subject to AF reception (CENELEC STANDARD).

Playing Compact Discs

The unit can control the built-in CD player as well as a multi-play CD player sold separately.

Parts Identification

- [2] Eject
- [6] Disc Insertion Slot
- [9] Disc Set
- [10] Source
- [11] Track Number Search
Fast Forward and Reverse
Step Number Search
- [13] Program Clear
- [14] Pause
- [15] Music Repeat
Random Play
Disc Repeat
- [16] ITP
Program Play
- [17] Highlight Scan
- [18] Disc Number Search
- [j] Fast Forward and Reverse modes
- [k] Pause
- [m] Music Repeat
Random Play
Disc Repeat
- [n] Program Play
- [p] Highlight Scan

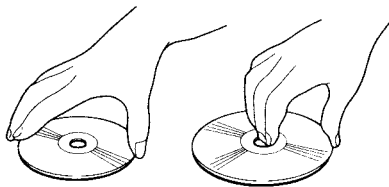
Discs

To avoid malfunctions and poor sound quality, note the following:

- ▶ Only use compact discs (optical digital audio discs) bearing the mark shown below.

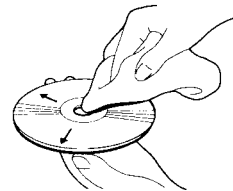


- ▶ Do not use cracked, scratched, or warped discs.
- ▶ Do not touch the disc's playing side. Handle the disc as shown below.



- ▶ Do not scratch the disc on either side.
- ▶ Do not affix any label on the disc.
- ▶ Do not apply any vinyl record spray, anti-static agent, benzene, paint thinner, or any other volatile chemicals.

- ▶ Do not play a dirty disc. Use a soft cloth to clean a dirty disc as shown below. Wipe the disc outward from the center.



- ▶ Do not place the disc in high temperatures and direct sunlight.
- ▶ Be sure to store the disc in its case.

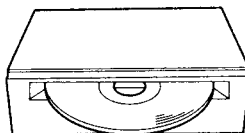
CD Playing Environment

- Disc playback may be interrupted by sudden road shock.
- When the air temperature is low and the car heater is turned on, condensation on the disc and internal parts of the unit may prevent proper playback operation. If this happens, turn off the unit and wait one hour until the condensation is gone. Also, use a soft cloth to wipe off any condensation from the disc.

Listening to the Built-in CD Player

- With the label side up, insert a disc into [6]. Playback will start. ([9] will light and the track number and playback time will be displayed.)
 - Do not insert 2 discs at the same time. Doing so will cause a malfunction.
 - When [9] is lit, it indicates that the disc is set. At this point, do not insert another disc. Doing so will scratch the disc or cause a malfunction.
 - Do not insert the disc with the label side down. Doing so may scratch the disc.
 - If the disc stops midway while it is being inserted or if there is no playback after a disc is inserted, something may be wrong with the disc. Eject the disc and check it.
- Turn ON/OFF the disc playback. Press button [10] to change the source.

- Eject the disc by pressing button [2].
 - After the button is pressed, it may take a while before the disc is ejected.
 - Do not leave the disc halfway into the unit as shown below. Doing so may cause the disc to be bent or dropped.



Listening to the Multi-Play CD Player

- Set the source to "multi-play CD player" by pressing button [10]. (The disc number, track number, and playback time will be displayed.)
 - For details, refer to "Changing the Source".
 - After a magazine is inserted into the multi-play CD player, it will take several seconds for disc playback to start. ("READY" will blink.) It is because the multi-play CD player will check the discs.
- A disc can be selected with a disc number search. Press a button from 1 to 6 of [18] to select the corresponding disc number from 1 to 6.
 - A disc number for which there is no installed disc cannot be set.
 - After a disc is selected, the player will replace the disc for playback and it will take several seconds for playback to start.

Using Track Number Search, Fast Forward and Reverse

- Set the mode to "track number search" or "fast forward and reverse". Press the (+) and (-) sides of button [11] simultaneously. Each time this is repeated, the mode will switch between the track number search mode and fast forward and reverse mode. (When the fast forward and reverse mode is set, "MANU" [j] will light.)
- Execute a track number search or fast forward and reverse by pressing button [11].

Track Number Search

+	Track Number Up
-	Track Number Down

- Hold down the button to change the track number up/down continuously.

Fast Forward and Reverse

+	Fast Forward
-	Reverse

- Playback sound can be heard during fast forward and reverse.

Pausing

- The disc playback can be stopped temporarily by pressing button [14]. (The "PAUSE" [k] frame will light and "PAUSE" will be displayed.) To cancel the pause, press the button again.
- During the pause, other operations (except fast forward and reverse) can be executed.
 - Pause may not work properly with old-model multi-play CD players.

Using Music Repeat and Random Play

- Music repeat allows a track to be played repeatedly and random play allows playback of tracks in random order. Each time the button [15] is pressed, the playback mode will change in the following sequence: Music Repeat "RPT" → Random Play "RDM" → Normal Play (During music repeat and random play, the "MODE" [m] frame will light.)
- During random play, the same track may be played again.

Using the Disc Repeat

- With a multi-play CD player, playback of a disc can be repeated. Press button [15] for at least 2 seconds. (The "MODE" [m] frame will light and "D-RPT" will be displayed.) To cancel, press the button for 2 seconds again.

Using the Highlight Scan

- Ten seconds of each track on the currently-playing disc can be played in sequence. Press button [17]. (The "T.SCAN" [p] frame will light.) To cancel, press the button again. Cancel the highlight scan when you hear the desired track. That track will then be played to the end.
- The playback starting point is set to 1 minute after the beginning of the track. This initial setting can be changed. (See "Changing the Starting Point for Highlight Scan".)
 - If the track's total playing time is shorter than the playback starting point's elapsed time, playback will begin about 10 seconds after the beginning of the track.
 - After the highlight scan completes the scan and returns to the first track it scanned, it will be canceled.
 - Highlight scan may not work properly with old-model multi-play CD players.

Changing the Starting Point for Highlight Scan

- Press button [17] for at least 2 seconds. The elapsed playback time at the point the button is pressed will be the starting point for the highlight scan. At the same time, highlight scan will start. (The "T.SCAN" [p] frame will light.)
- The starting point will be rounded off and set in 10-second multiples.

Using Program Play

(Instant Track Programming [ITP])

From the discs in a magazine loaded in a multi-play CD player, the desired tracks can be programmed to play in the desired sequence.

- The program is stored for each magazine.
- The magazine is identified with the disc in tray 1. Therefore, be sure to load a disc on tray 1 of the magazine.
- A program can be set even when there is no disc on tray 1. However, the program will be erased when the magazine is ejected.
- Programs for up to 16 magazines can be stored. If more than 16 magazines are programmed, the newest program will overwrite the oldest program.
- One program can have a maximum of 32 steps.
- Program play may not work properly with old-model multi-play CD players.

Programming

1. Play the track to be programmed.
 2. Store the track by pressing button [16]. (The stored track sequence "P-01" will be displayed.)
 3. Store the next steps by repeating steps 1 and 2 above.
- A maximum of 32 steps can be stored. If a 33rd step is attempted to be stored, "FULL" will be displayed.

D: Display
C: Cause
T: Treatment

D: ERROR-00, 10, 12, 50, 60, 70, A0

C: Electrical or mechanical fault.

T: Turn off the car's ignition and turn it back on again. Or change the source to another one and then change it back to CD.

D: HEAT

C: The CD player's internal temperature is high.

T: Wait until the CD player's internal temperature goes down.

- If an error other than the above is displayed, refer to the multi-play CD player's Owner's Manual.

Playing Back a Program

Press button [16] for at least 2 seconds. (The "ITP" [n] frame will light and track sequence "PP01" will be displayed.)

To cancel, press the button again.

- The tracks will be played in the programmed sequence. After all the programmed tracks are played, programmed playback will start again from step 1.
- If programmed playback is attempted for a magazine that has not been programmed, "EMPTY" will be displayed.
- During programmed playback: pressing the (+) side of button [11] will increase the program step, pressing the (-) side will decrease it.

Erasing a Single Selection from a Program

1. Start programmed playback by pressing button [16] for at least 2 seconds.
 2. Select the track to be erased by pressing button [11].
 3. Erase the track by pressing button [13] for at least 2 seconds until there is a beep.
- The program steps following the erased step will be moved up accordingly in sequence.

Erasing an Entire Program

During normal playback, press button [13] for at least 2 seconds until there is a beep. ("CLEAR" will be displayed.)

The program for the magazine being played will be erased completely.

- The program cannot be erased during music repeat, random play, disc repeat, or highlight scan.

Additional Functions

Parts Identification

[4] Illumination

[12] Clock

[18] 1 = Hour
2 = Minute

Switching Illumination Color

The illumination color can be set to amber or green. (The initial setting is amber.)

Press button [4] for at least 2 seconds.

Repeat this operation to switch between amber and green.

- When the unit is in equalizer mode, the illumination color can not be switched.

Regarding the Cellular Telephone Muting

When a call is received or placed with a cellular telephone, the cellular telephone muting will turn ON. When the phone is hung up, the muting will be canceled.

Cellular Telephone Muting

- The volume is reduced to a low level. (If the attenuator is ON, the volume will not be reduced.)
- "CALL" will be displayed. (When a traffic report is being received, "CALL" will blink.)
- The audio operation can not be done except volume control.

Error Display

If there is a problem with CD playback, an error code will be displayed.

(Ex.: "ERROR-10")

If an error is displayed, refer to the table below to identify the problem. If the error is displayed even after corrective action is taken, contact your dealer or the nearest authorized PIONEER Service Station.

D: Display

C: Cause

T: Treatment

D: ERROR-00, 11, 12, 30

C: The disc is dirty.

T: Clean the disc.

D: ERROR-00, 11, 12, 30

C: The disc is scratched.

T: Replace the disc.

D: ERROR-00, 11, 12, 14

C: The disc is inserted with the label side down.

T: Insert the disc with the label side up.

D: ERROR-00, 14

C: An unrecorded CD-R is being used.

T: Check the disc.

D: ERROR-00, 80

C: An empty magazine is in the multi-play CD player.

T: Insert discs into the magazine.

Using the Clock Display

Displaying the Time

Press button [12].

To cancel, press the button again.

- The clock can be displayed only when the power is ON.
- When another operation is executed, the clock will turn off for about 25 seconds and then turn on again.

Adjusting the Hour

While pressing button [12], press button "1" [18] to advance the hour by one hour.

- When the button is held down, the hour will change quickly.

Adjusting the Minute

While pressing button [12], press button "2" [18] to advance the minute by one minute.

- When the button is held down, the minute will change quickly.
- After the minute is adjusted, the clock will start from 0 second when button [12] is released.

Connecting the Units

Note:

- ▶ This unit is for vehicles with a 12-volt battery and negative grounding. Before installing it in a recreational vehicle, truck, or bus, check the battery voltage.
- ▶ To avoid shorts in the electrical system, be sure to disconnect the battery \ominus cable before beginning installation.
- ▶ After completing installation and wiring, double check that there are no mistakes. Re-install any parts removed from the car during installation, then connect the battery negative terminal.
- ▶ Refer to the owner's manual for details on connecting the various cords of the power amp and other units, then make connections correctly.
- ▶ Secure the wiring with cable clamps or adhesive tape. To protect the wiring, wrap adhesive tape around them where they lie against metal parts.
- ▶ Route and secure all wiring so it cannot touch any moving parts, such as the gear shift, handbrake, and seat rails. Do not route wiring in places that get hot, such as near the heater outlet. If the insulation of the wiring melts or gets torn, there is a danger of the wiring short-circuiting to the vehicle body.
- ▶ Don't pass the orange lead through a hole into the engine compartment to connect to the battery. This will damage the lead insulation and cause a very dangerous short.
- ▶ Do not shorten any leads. If you do, the protection circuit may fail to work when it should.
- ▶ Never feed power to other equipment by cutting the insulation of the power supply lead of the unit and tapping into the lead. The current capacity of the lead will be exceeded, causing over heating.
- ▶ When replacing fuses, be sure to use only fuses of the rating prescribed on the fuse holder.
- ▶ Since a unique BPTL circuit is employed, never wire so the speaker leads are directly grounded or the left and right speaker \ominus leads are common.
- ▶ Speakers connected to this unit must be high-power type possessing maximum input of at least 30 W and impedance of 4 to 8 ohms. Connecting speakers with output and/or impedance values other than those noted here can damage the speakers.
- ▶ When the power amp is being linked with this system, be sure not to connect the blue lead to the amp's power terminal. Likewise, when linking this system with the auto-antenna, do not connect to power terminal for the antenna. Such connection can make overcurrent cause malfunctions.

Connection Diagram (Fig. 1)

1. Power amp (sold separately)
2. Connecting cords with RCA pin plugs (sold separately)
3. Blue
4. Front/left speaker
5. Front/right speaker
6. Green
7. Gray
8. Green/black
9. Gray/black
10. Rear/left speaker
11. Rear/right speaker
12. Green/red
13. Gray/red
14. Black/green
15. Black/gray
16. Connected only when the optional amplifier is used. Nothing is connected when operating the built-in amplifier itself.
17. White
18. Red
19. Rear out
20. Front out
21. Antenna jack
22. Blue
To system control terminal of the power amp or Auto-antenna relay control terminal (Max. 300 mA 12 V DC).
23. Fuse holder
24. Multi-play CD player terminal
25. Multi-play CD player (sold separately)
26. Fuse resistor
27. Black (ground)
To vehicle (metal) body.
28. Orange
To terminal always supplied with power regardless of ignition switch position.
29. Red
To electric terminal controlled by ignition switch (12 V DC) ON/OFF.
30. Yellow
To lighting switch terminal.
31. Yellow/black
Cellular Mute
If you use a cellular telephone, connect it via the Audio Mute lead on the cellular telephone. If not, keep the Audio Mute lead free of any connections.

• Connection Diagram

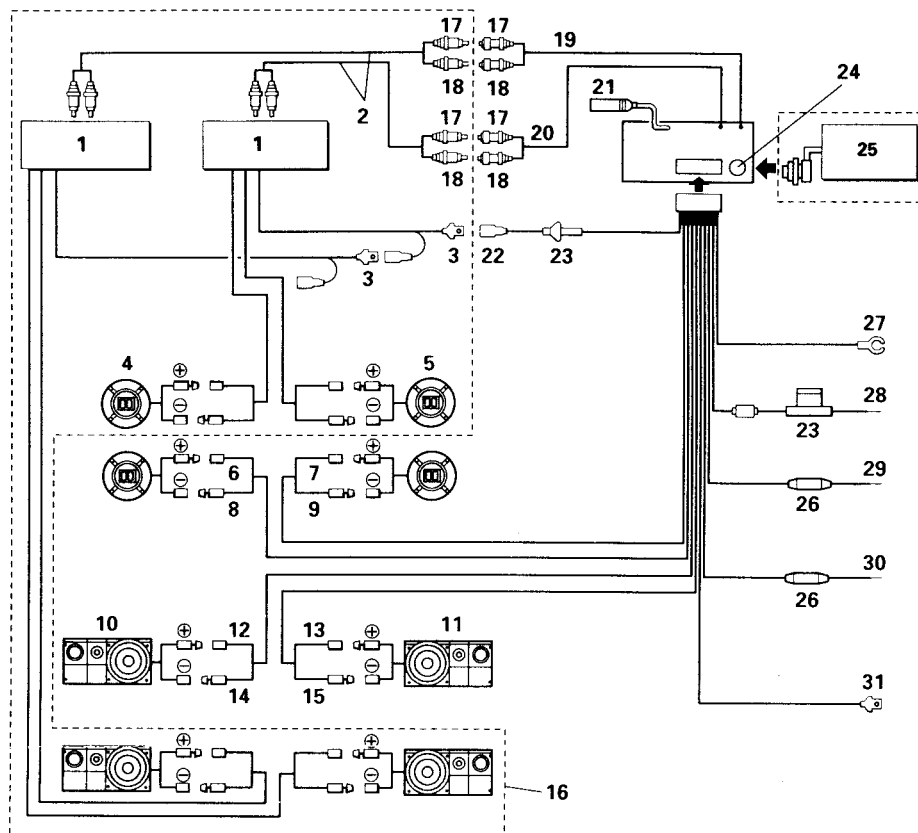


Fig. 1

4. DISASSEMBLY

• Case

1. Remove the two screws.
2. Insert and turn a screwdriver at locations indicated by arrows to remove the case.

• Detach Grille Assy

1. Press the detach button, and then pull detach grille assy.

• Panel Assy

1. Disconnect the three stoppers indicated by arrow.
2. Remove the screw.
3. Disconnect the two connectors.
4. Remove the panel assy.

• CD Mechanism Module

1. Remove the four screws.
2. Disconnect the connector.
3. Remove the CD mechanism module.

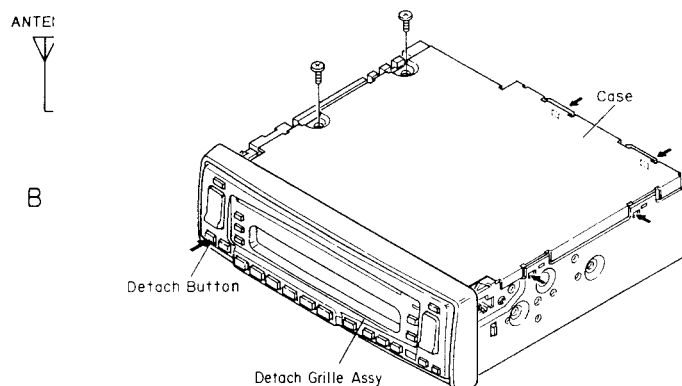


Fig. 3

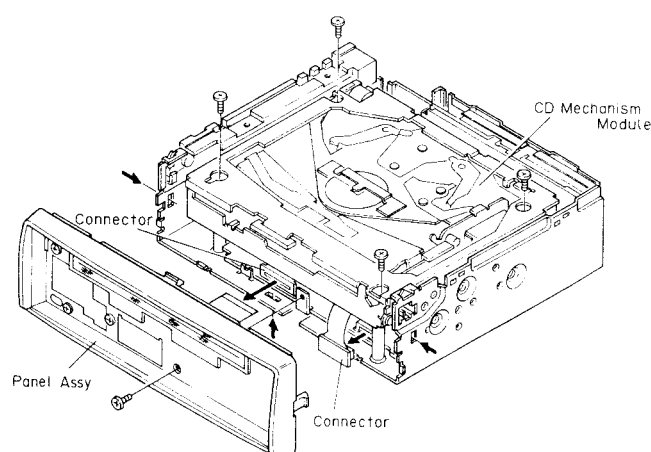


Fig. 4

• Chassis Unit

1. Remove the four screws A and the three screws B.
2. Remove the heat sink.
3. Remove the three screws C and the screw D, and then remove the holder.
4. Stretch the two claws.
5. Remove the chassis unit.

• PU Unit, Carriage Motor Assy

1. Remove the spring B as indicated by the arrow. (Fig. 6)
2. Remove the spring A. (Fig. 6)
3. Remove the engagement as indicated by the arrows 1 and 2, and then remove the clamber assy. (Fig. 6)

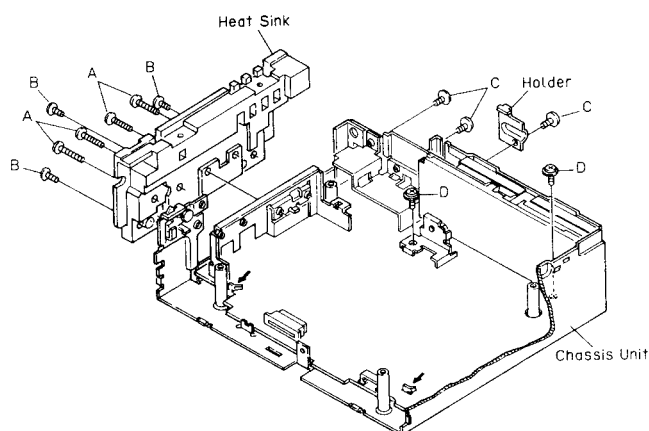


Fig. 5

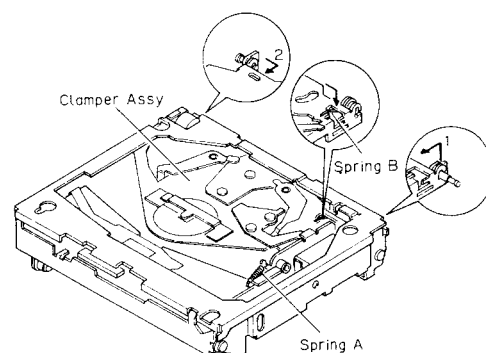


Fig. 6

4. Fix short pin when removing the CN351 connector.(For protection of the PU unit.) (Fig. 7)
5. Remove the three screws. (Fig. 7)
6. Since the control unit is connected to the switch substrate by means of connector, disconnect the connector and then remove the control unit right downward. (Fig. 7)

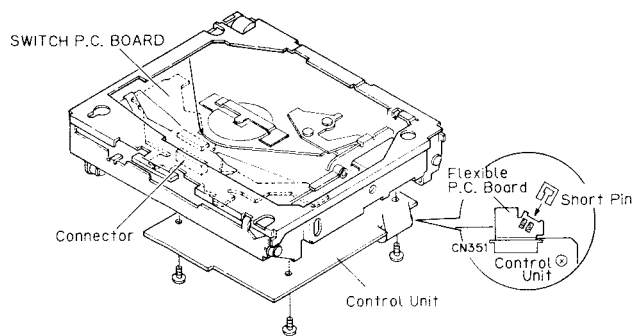


Fig. 7

7. Hook the spring as shown in the figure.(Fig. 8)
8. Remove the holder and screw.(Fig. 8)
9. Remove the flexible P.C. board.(Fig. 8)
10. Remove the PU unit.(Fig. 8)

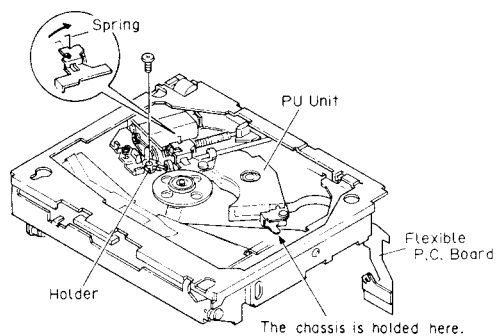


Fig. 8

11. Remove the screw, and then remove the carriage motor assy.(Fig. 9)

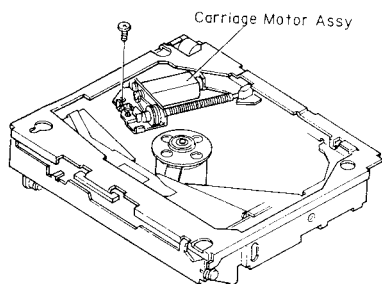


Fig. 9

• Damper Unit, Loading Motor

1. Turn the gear A manually in the arrow direction. (Fig. 10)
2. Press the rack gear in the arrow direction and engage gears.(Fig. 10)
3. Put into the play mode. (The clamber assembly is at low position.) (Fig. 10)

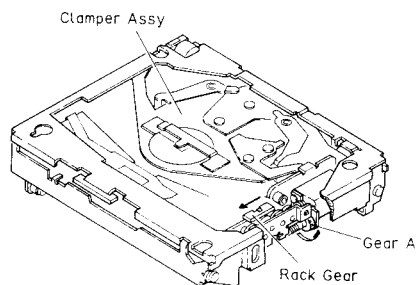


Fig. 10

4. Remove the four springs indicated by arrow. (Fig. 11)
5. Remove the two screws A, and then remove the side frame assy.(Fig. 11)
6. Remove the two screw B, and then remove the damper assy.(Fig. 11)

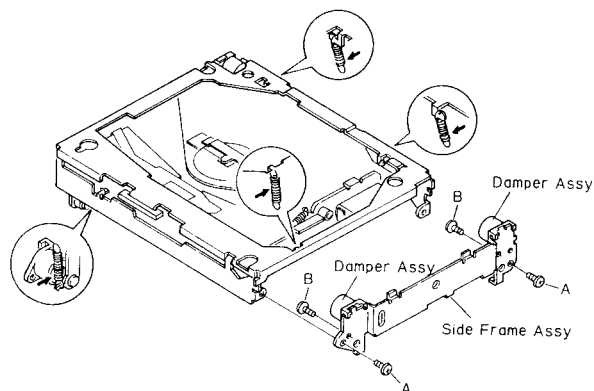


Fig. 11

7. Remove the frame assy from the mechanical parts.(Fig. 12)
8. Remove the two screws C, and then remove the damper assy.(Fig. 12)
9. Remove the clamper assy as shown in Fig. 12.

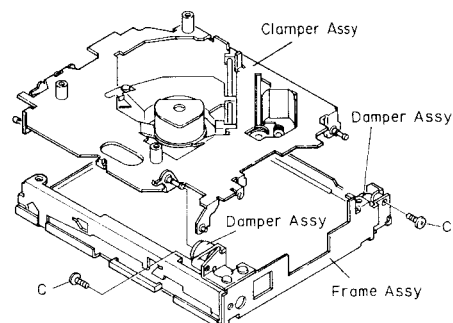


Fig. 12

10. Turn the Loading gear to put into the ejection. (Fig. 13)
11. Remove one of the screws and remove the gear unit pressing the arm slightly toward the arrow. (Fig. 13)

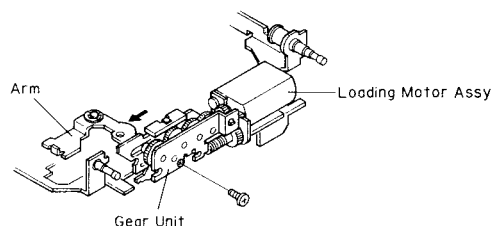


Fig. 13

12. Remove the screw, and then remove the loading motor assy.(Fig. 14)

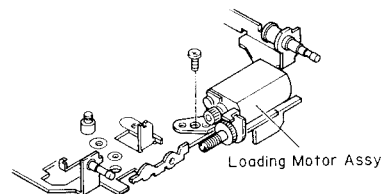


Fig. 14

• Gear Unit

13. Shift lever as shown in Fig. 15.
14. Remove the shaft A from C of lever.

15. Shift the gear as shown in Fig. 15.
16. Remove the shaft B from C of lever.

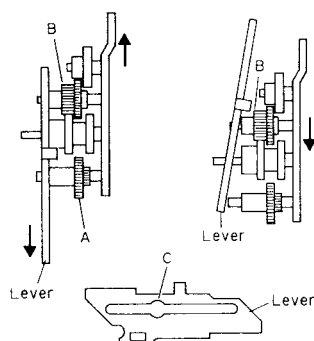


Fig. 15

5. ADJUSTMENT

1)Precautions

- This unit uses a single power supply (+5V) for the regulator. The signal reference potential, therefore, is connected to REFOUT (approx. 2.5V) instead of GND.

If REFOUT and GND are connected to each other by mistake during adjustments, not only will it be impossible to measure the potential correctly, but the servo will malfunction and a severe shock will be applied to the pick-up. To avoid this, take special note of the following.

Do not connect the negative probe of the measuring equipment to REFOUT and GND together. It is especially important not to connect the channel 1 negative probe of the oscilloscope to REFOUT with the channel 2 negative probe connected to GND.

And since the frame of the measuring instrument is usually at the same potential as the negative probe, change the frame of the measuring instrument to floating status.

If by accident REFOUT comes in contact with GND, immediately switch the regulator or power OFF.

- Always make sure the regulator is OFF when connecting and disconnecting the various filters and wiring required for measurements.
- Before proceeding to further adjustments and measurements after switching regulator ON, let the player run for about one minute to allow the circuits to stabilize.
- Since the protective systems in the unit's software are rendered inoperative in test mode, be very careful to avoid mechanical and/or electrical shocks to the system when making adjustment.

Key	Function
REL/BAND	Regulator ON/OFF
TRACK+	FWD Kick
TRACK-	REV Kick
EJECT	EJECT
TRACK+ + TRACK-	Jump mode

- Test mode starting procedure
Switch ACC, back-up ON while pressing the 4 and 6 keys together.
- Test mode cancellation
Switch ACC, back-up OFF.
- Disc detection during loading and eject operations is performed by means of a photo transistor in this unit. Consequently, if the inside of the unit is exposed to a strong light source when the outer casing is removed for repairs or adjustment, the following malfunctions may occur.
*During PLAY, even if the eject button is pressed, the disc will not be ejected and the unit will remain in the PLAY mode.
*The unit will not load a disc.
When the unit malfunctions this way, either reposition the light source, move the unit or cover the photo transistor.
- When loading and unloading discs during adjustment procedures, always wait for the disc to be properly clamped or ejected before pressing the another key. Otherwise, there is risk of the actuator being destroyed.
- Turn power off when pressing the button TRACK+ or the button TRACK- key for focus search in the test mode. (Or else lens may stick and the actuator may be damaged.)

Key	Function
SCAN	Tracking close
MODE	Tracking open
ITP	Focus close
CD	CD ON/OFF

- SINGLE/10TRK/32TRK will continue to operate even after the key is released. Tracking closed the moment C-MOVE is released.
- JUMP MODE resets to SINGLE as soon as power is off.

●Flow Chart

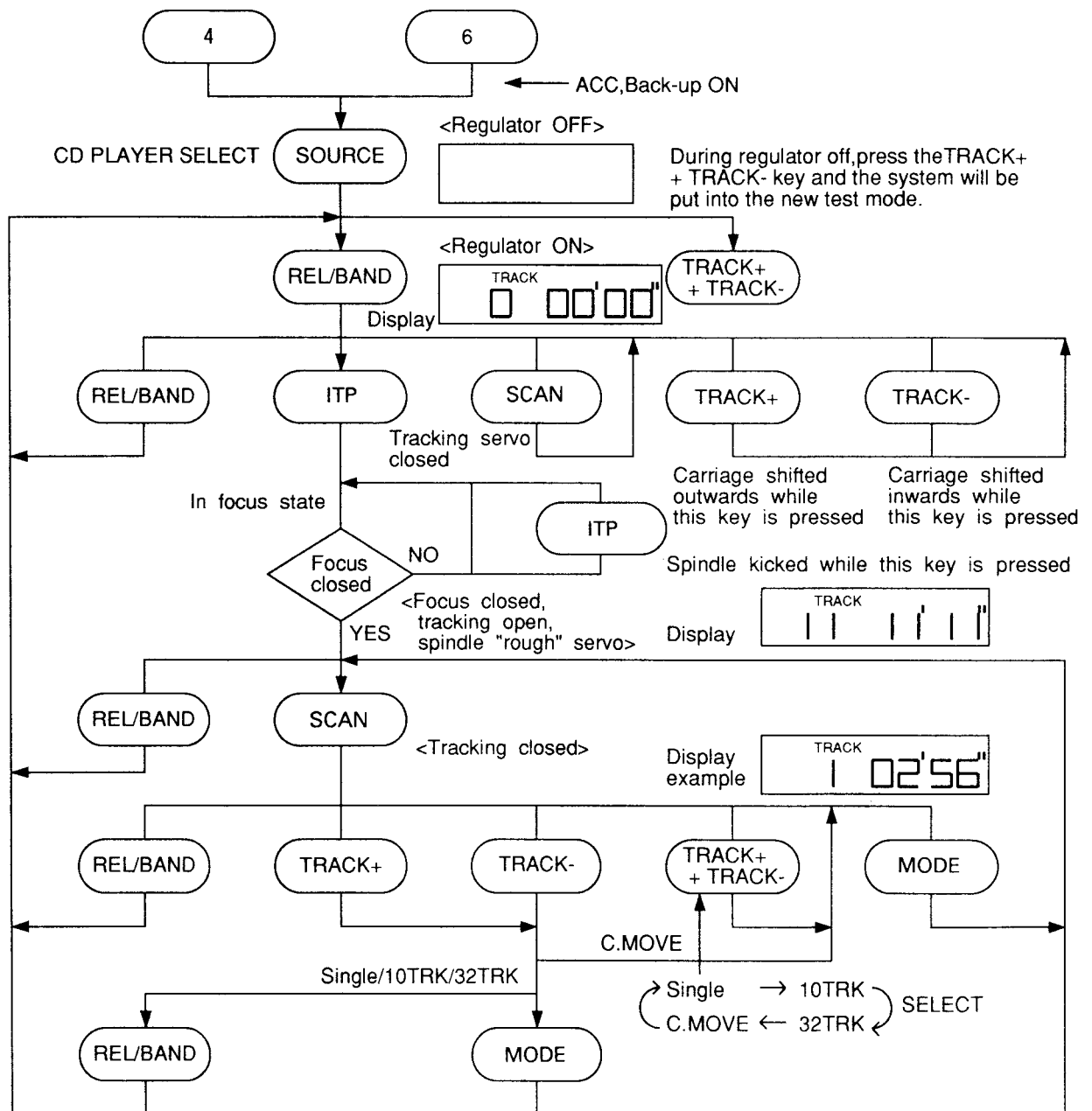
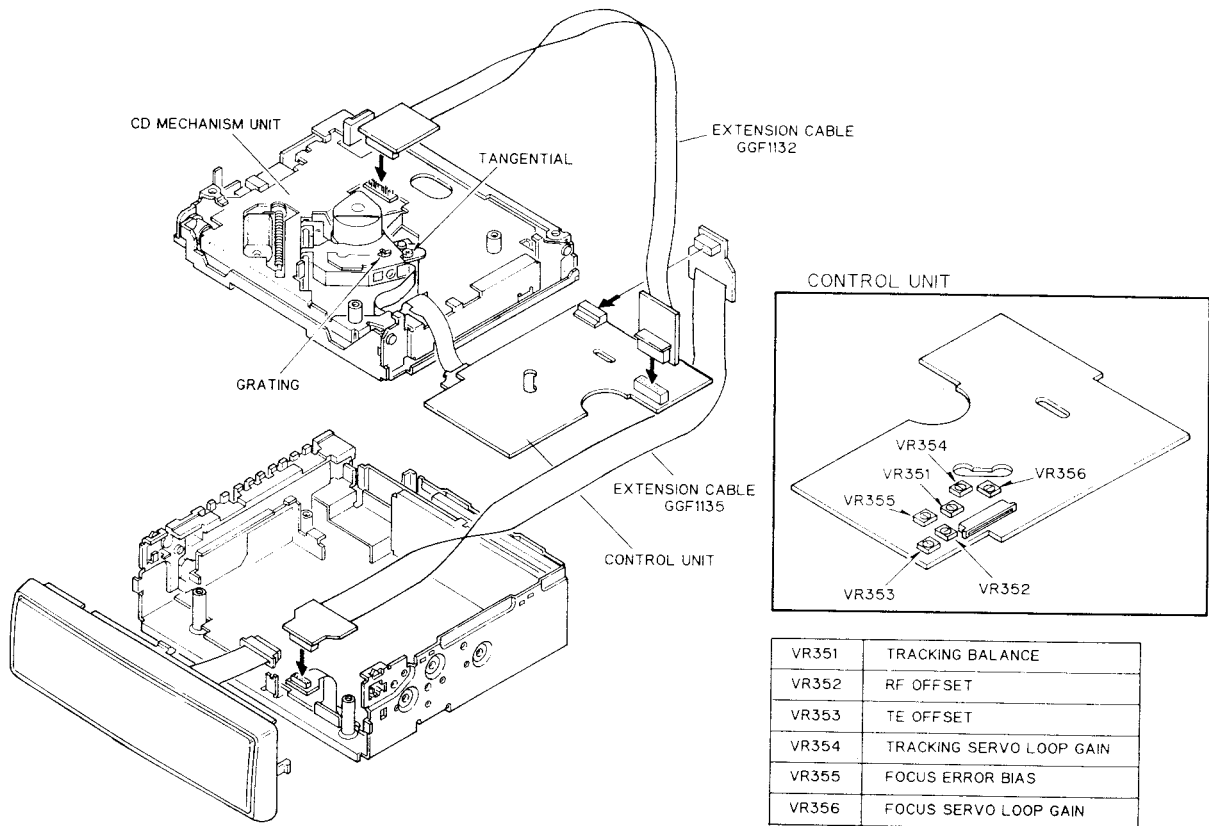


Fig. 16

● Measuring Equipment and Jigs

Adjustment	Measuring equipment&jigs
Grating Adjustment	Oscilloscope, clock driver, grating adjustment filter (bandpass filter) (GGF-133), AC millivoltmeter TCD-782 (or SONY TYPE 4) Extension Cable: GGF1132, GGF1135, GGF1128, GGF1126, GGF-070
Tangential Skew Check	Oscilloscope, screwdriver TCD-782 (or SONY TYPE 4) Extension Cable: GGF1132, GGF1135, GGF1128, GGF1126, GGF-070
Grating Adjustment	Oscilloscope, clock driver, two low-pass filters TCD-782 (or SONY TYPE 4) Extension Cable: GGF1132, GGF1135, GGF1128, GGF1126, GGF-070
FE Bias Adjustment	Oscilloscope TCD-782 (or SONY TYPE 4) Extension Cable: GGF1132, GGF1135, GGF1128, GGF1126, GGF-070
RF Offset Adjustment	Oscilloscope TCD-782 (or SONY TYPE 4) Extension Cable: GGF1132, GGF1135, GGF1128, GGF1126, GGF-070
TE Offset Adjustment-1	DC voltmeter Extension Cable: GGF1132, GGF1135, GGF1128, GGF1126, GGF-070
Tracking Balance Adjustment-1	Oscilloscope TCD-782 (or SONY TYPE 4) Extension Cable: GGF1132, GGF1135, GGF1128, GGF1126, GGF-070
Focus Servo Loop Gain Adjustment	Oscillator, gain adjustment filter (GGF-065), dual meter milli-voltmeter TCD-782 (or SONY TYPE 4) Extension Cable: GGF1132, GGF1135, GGF1128, GGF1126, GGF-070
Tracking Servo Loop Gain Adjustment	Oscillator, gain adjustment filter (GGF-065), dual meter milli-voltmeter TCD-782 (or SONY TYPE 4) Extension Cable: GGF1132, GGF1135, GGF1128, GGF1126, GGF-070
TE Offset Adjustment-2	DC voltmeter Extension Cable: GGF1132, GGF1135, GGF1128, GGF1126, GGF-070
Tracking Balance Adjustment-2	Oscilloscope TCD-782 (or SONY TYPE 4) Extension Cable: GGF1132, GGF1135, GGF1128, GGF1126, GGF-070

● Adjustment Point



Note:

CD mechanism module can be adjusted without removing control unit.

Fig. 17

●Test Point

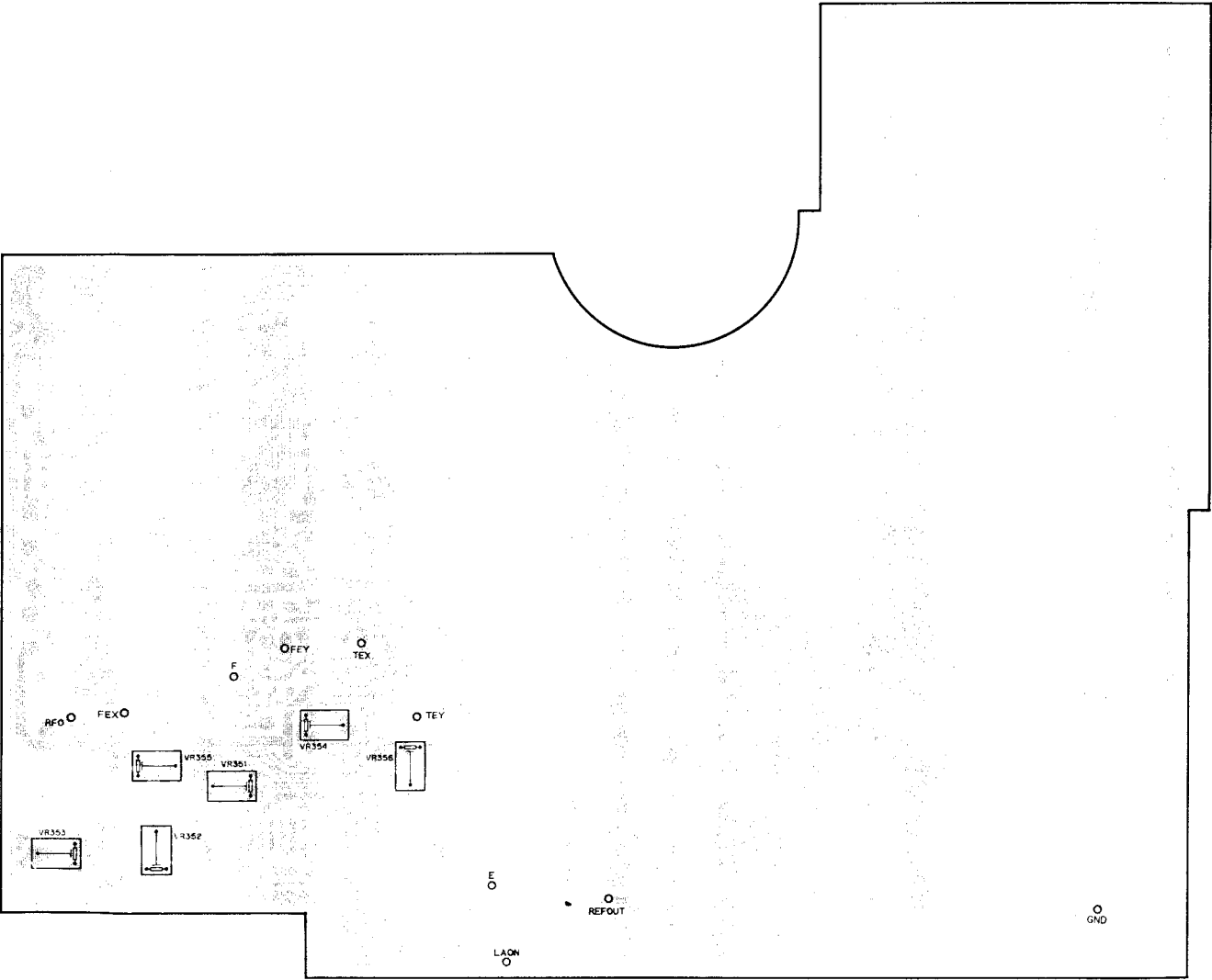


Fig. 18

5.1 Grating Adjustment (Rough adjustment)

- **Purpose:**
The grating may need adjustment in a replaced pick-up unit.
- **Maladjustment symptoms:**
No disc playback; track jumping.

- **Measuring equipment / jigs**
 - Oscilloscope, clock driver, grating adjustment filter (bandpass filter)(GGF-133), AC millivoltmeter.
- **Measuring point**
 - TEY
- **Test disc and setting**
 - TCD-782 (or SONY TYPE 4)
 - Test mode.
- **Adjustment position**
 - Pick-up grating adjustment hole.

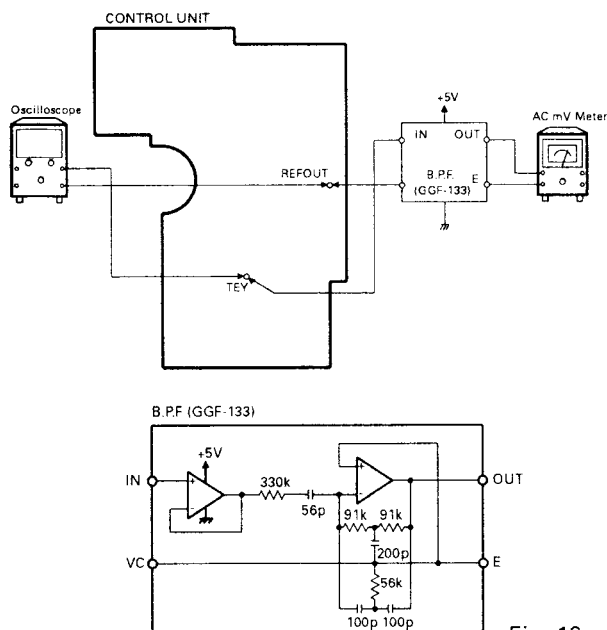


Fig. 19

Adjustment Procedure

1. Switch regulator ON in test mode, and load a disc.
2. Use **TRACK+** or **TRACK-** key as required to bring pick-up at the adjusting hole on control unit (Tune TNO 19). (TYPE 4:TNO 14)
Mutch with TNO 19 (TYPE 4:TNO 14) when releweing the control unit.
3. Press the **ITP** key to close focus.
4. While monitoring the TEY filter output by AC millivoltmeter, turn the grating adjustment hole slowly. The AC voltage increasae and decreases while turning the screw. Search for the minimum voltage level. (This corresponds to the position where the grating is on a track, and is referred to as the null point.)
5. Then while monitoring TEY by oscilloscope, turn the driver slowly clockwise from the null point (as seen from under the pick-up) until the first wave form peak amplitude is reached.

5.2 Tangential Skew Check

- **Purpose:**
To check whether tangential skew has been misaligned or not when replacing the pick-up unit.
- **Maladjustment symptoms:**
No disc playback; track jumping.

- **Measuring equipment / jigs**
 - Oscilloscope, screwdriver
- **Measuring point**
 - RFO
- **Test disc and setting**
 - TCD-782 (or SONY TYPE 4)
 - Normal mode
- **Adjustment position**
 - Pick-up tangential adjustment screw

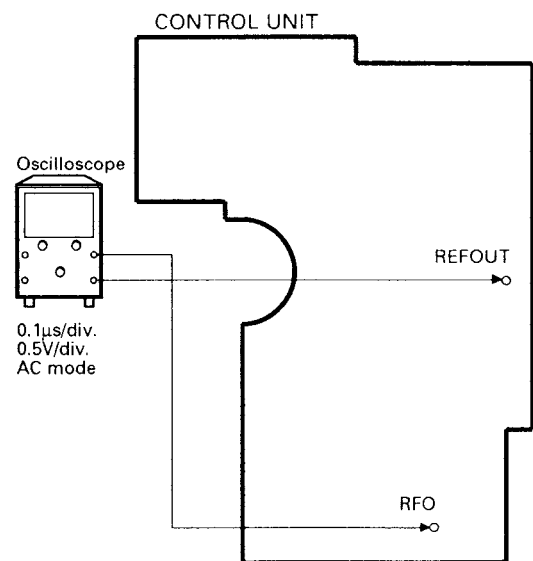


Fig. 20

Adjustment Procedure

1. Check that the pick-up position does not differ from that at the same time of grating adjustment. (TCD-782:TNO19, TYPE 4:TNO 14)
2. Turn the tangential adjustment screw to obtain a good RF waveform eye pattern. Turn the adjustment screw both clockwise and counterclockwise to points where the eye pattern deteriorates, and take the mid-way point as the adjustment point. As a general guide, look for an overall clear waveform, and one of the diamond shapes in the eye pattern. The diamond shapes should appear in fine lines at the point of optimum adjustment. Take care not to knock the pick-up with the screwdriver at this stage. (This kind of accident can result in loss of focus.) (See Fig. 21,22)
3. Apply "screw-lock" to the tangential adjustment screw.
4. After adjusting tangential skew, also adjust the grating.

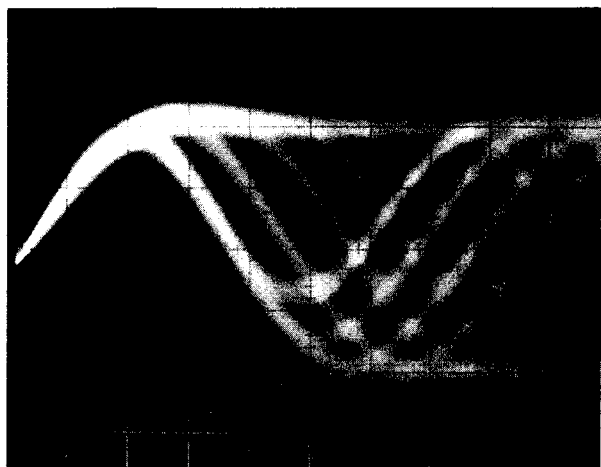
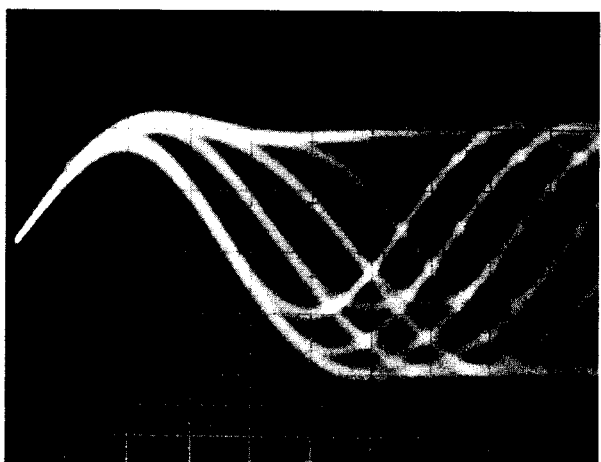


Fig. 21



AC Mode
0.5V/div.
0.1μs/div.

Fig. 22

5.3 Grating Adjustment(Fine adjustment)

• Purpose:

The grating may need adjustment in a replaced pick-up unit.

• Maladjustment symptoms:

No disc playback; track jumping.

• Measuring equipment / jigs

• Measuring point

• Test disc and setting

• Adjustment position

• Oscilloscope, clock driver, two low-pass filters

• TEY, ELPF output, FLPF output

• TCD-782 (or SONY TYPE 4)

• Test mode

• Pick-up grating adjustment hole

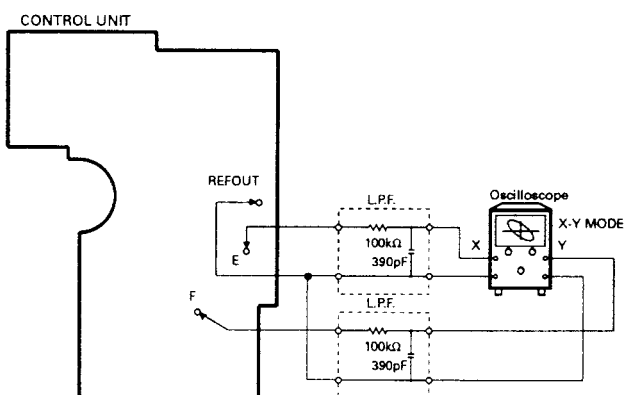


Fig. 23

Adjustment Procedure

1. Switch regulator ON in test mode, and load a disc.
2. Use **TRACK+** or **TRACK-** key as required to bring pick-up at the adjusting hole on control unit (Tune TNO 19). (TYPE 4:TNO 14)
Mutch with TNO 19 (TYPE 4:TNO 14) when releweing the control unit.
3. Press the **ITP** key to close focus.
4. With the E low-pass filter output connected to the X axis of the oscilloscope, and the F low-pass filter output connected to the Y axis, apply an input in AC mode and observe the Lissajous figure.(Fig.24-29)
5. Using the driver, adjust the Lissajous figure to a single line (or as close as possible).
6. Switch regulator OFF and remove the filters.

TEY waveform 5ms/div, 0.5V/div.

Null Point

Lissajous figure (AC input)
Horizontal axis E 20mV/div.
Vertical axis F 20mV/div.

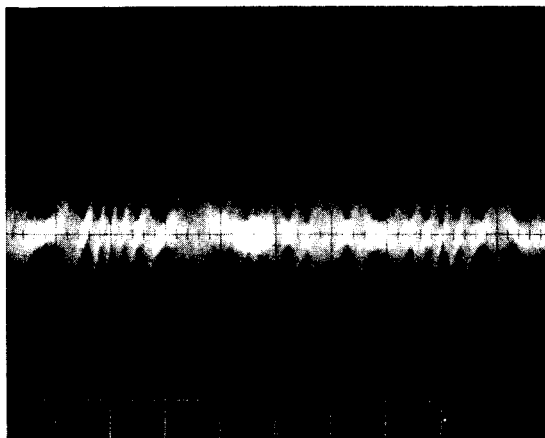


Fig. 24

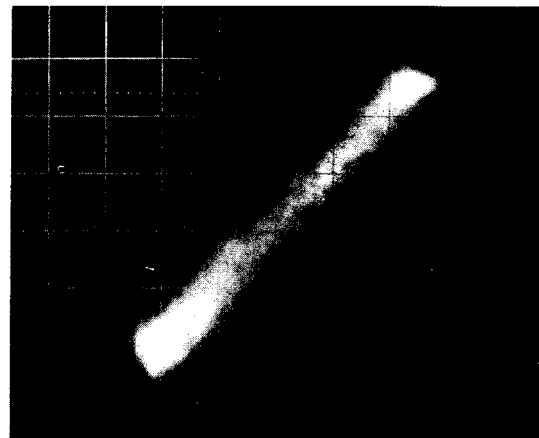


Fig. 25



"Rough" adjustment

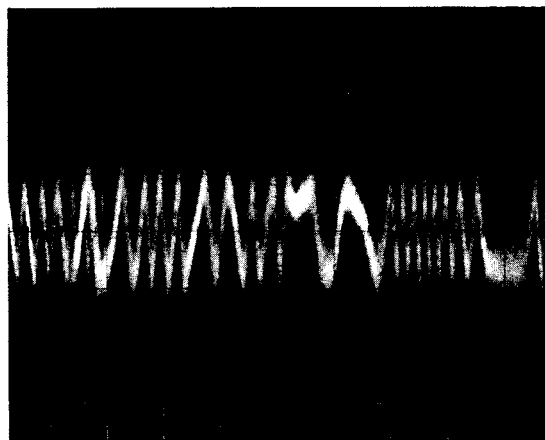


Fig. 26

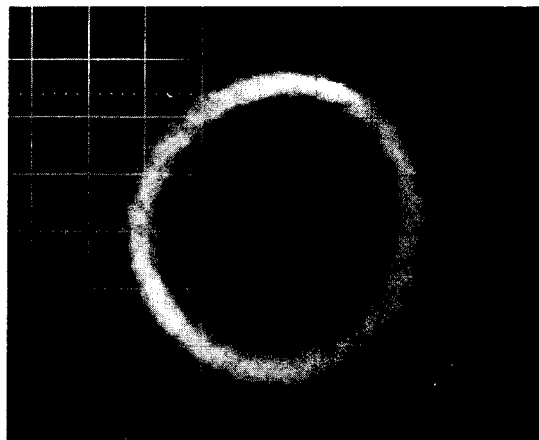


Fig. 27



Final adjustment

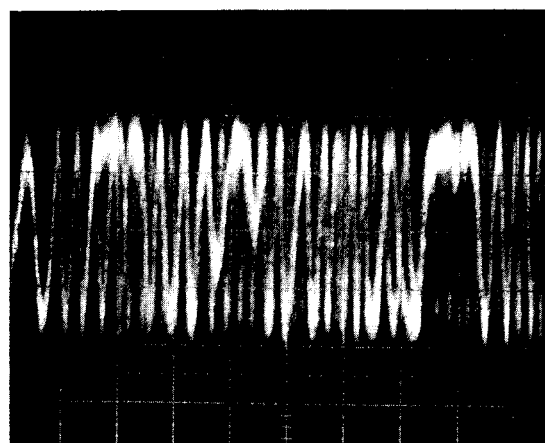


Fig. 28

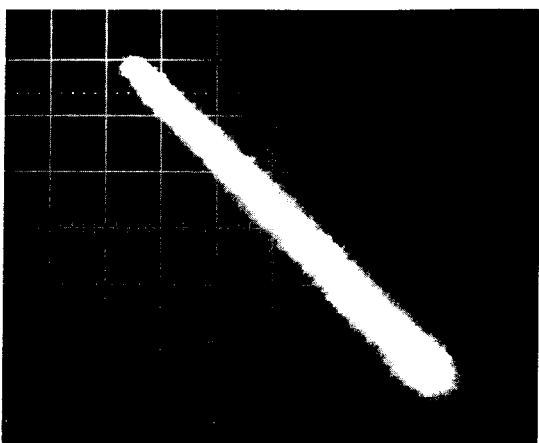


Fig. 29

5.4 FE Bias Adjustment

• Purpose:

To adjust the focus servo bias to an optimum value.

• Maladjustment symptoms:

Focus closing difficulty, poor playability.

• Measuring equipment / jigs

• Oscilloscope

• Measuring point

• RFO

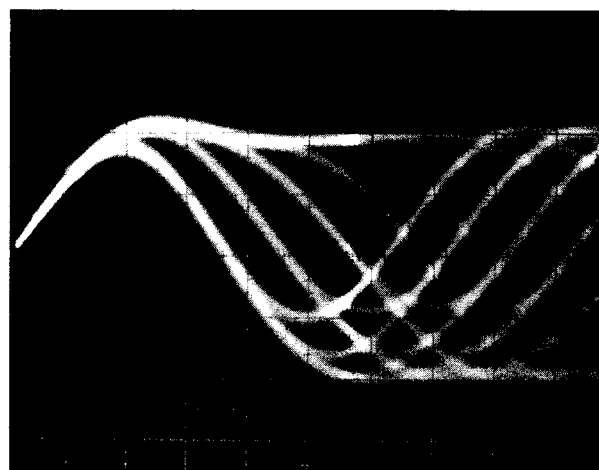
• Test disc and setting

• TCD-782 (or SONY TYPE 4)

• Normal mode

• Adjustment position

• VR355(FEB)



OK

Fig. 31



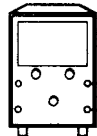
AC Mode

Before adjustment

Fig. 32

CONTROL UNIT

Oscilloscope



REFOUT

RFO

Fig. 30

Adjustment Procedure

1. Play in normal mode.
2. Observe RFO in respect to REFOUT in the oscilloscope, and adjust VR355(FEB) to obtain maximum RF and optimum eye pattern. (See Fig. 31, 32)

5.5 RF Offset Adjustment

- **Purpose:**
To adjust the RF amplifier offset to a suitable value.
- **Maladjustment symptoms:**
Focus closure fails readily.

- **Measuring equipment / jigs**
 - **Measuring point**
 - **Test disc and setting**
 - **Adjustment position**
- Oscilloscope
 - RFO
 - TCD-782 (or SONY TYPE 4)
 - Normal mode
 - VR352(RFO)

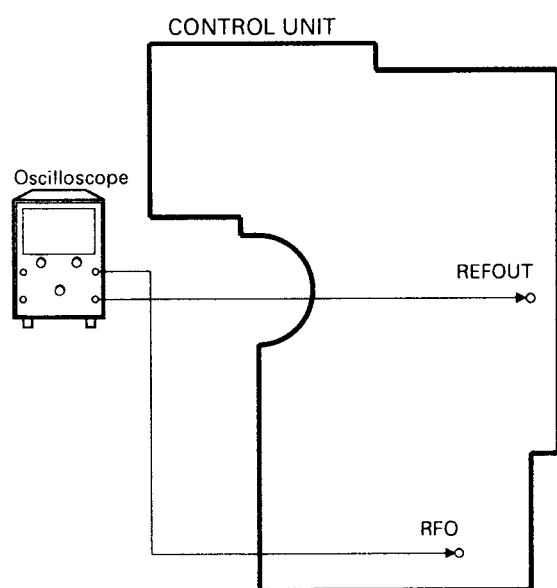
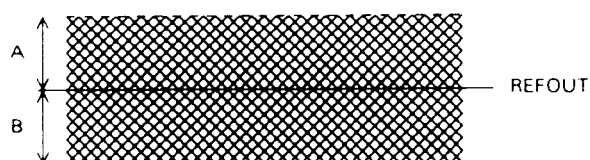


Fig. 33

Adjustment Procedure

1. Play tune TNO 19 in normal mode.(TYPE 4:TNO 14)
2. Use VR352 to adjust the RFO waveform so that REFOUT appears at the center.(A-B must not exceed 100 mV.)



5.6 TE Offset Adjustment-1

- **Purpose:**
To adjust the electrical offset of the tracking servo to zero
- **Maladjustment symptoms:**
Search times too long,carriage run-away.

- **Measuring equipment / jigs**
 - **Measuring point**
 - **Test disc and setting**
 - **Adjustment position**
- DC voltmeter
 - TEY
 - No Disc
 - Test mode
 - VR353(TEO)

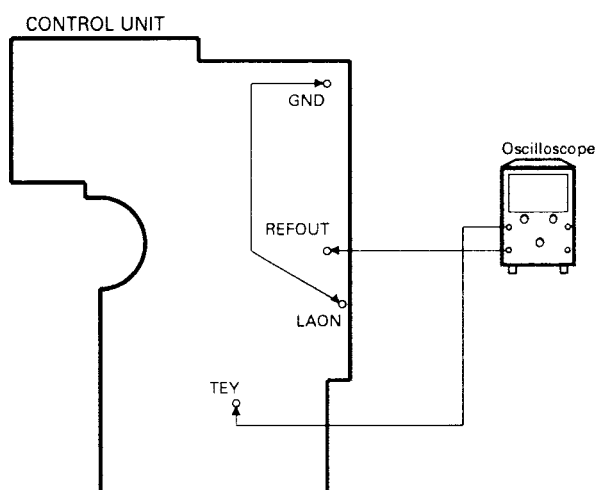


Fig. 34

Adjustment Procedure

1. Connect LAON to GND.
2. Switch regulator ON while in test mode.
3. Using VR353(TEO),adjust the TEY output DC voltage in reference to REFOUT to a value of $0 \pm 25\text{mV}$.
4. Switch regulator OFF.

5.7 Tracking Balance Adjustment-1

• Purpose:

To adjust the tracking servo offset to zero.

• Maladjustment symptoms:

Search times too long, poor playability, carriage run-away.

• Measuring equipment / jigs

• Oscilloscope

• Measuring point

• TEY (Tracking error signal)

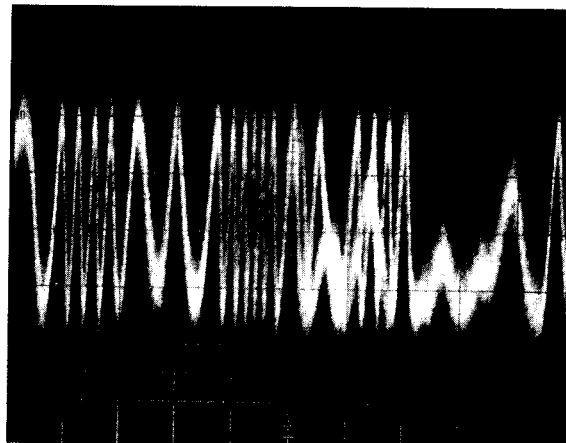
• Test disc and setting

• TCD-782 (or SONY TYPE 4)

• Test mode

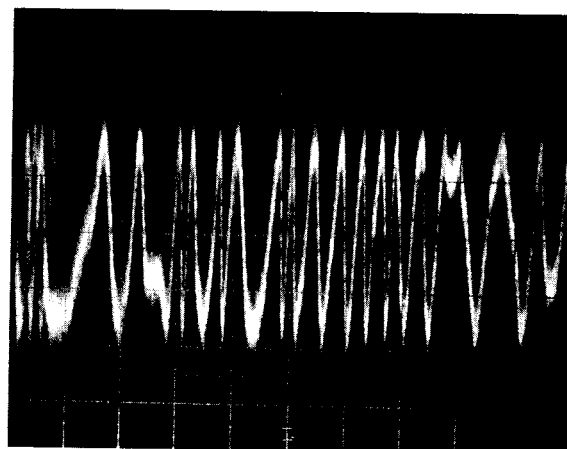
• Adjustment position

• VR351(T.BAL)



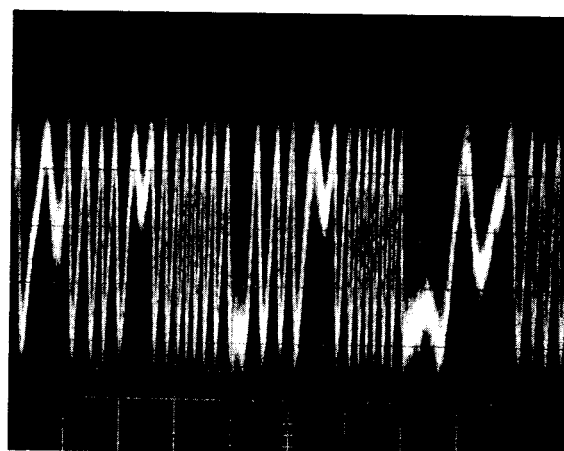
+ 5% NG

Fig. 36



± 0% OK

Fig. 37



- 5% NG

Fig. 38

10ms/div.
0.5V/div.
DC Mode

CONTROL UNIT

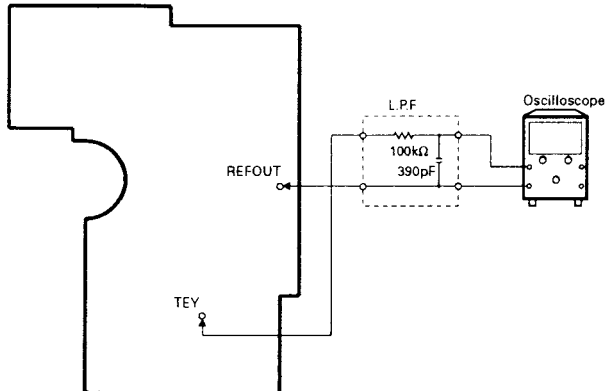


Fig. 35

Adjustment Procedure

1. Set the test disc (TCD-782). Switch regulator ON.
2. Using the **TRACK+** or **TRACK-** key, move the pick-up to about the center of the signal surface.
3. Press the **ITP** key to close focus.
4. Using an oscilloscope, observe the TEY signal in respect to REFOUT.
Then adjust VR351(T.BAL) to set the positive and negative amplitudes to the same levels. (See Fig. 36-38)
5. Switch the power OFF.

5.8 Focus Servo Loop Gain Adjustment

• Purpose:

To adjust the focus servo loop gain to an optimum value.

• Maladjustment symptoms:

Poor playability, reduced resistance to vibration, focus closure fails readily.

• Measuring equipment / jigs

• Oscillator, gain adjustment filter (GGF-065), dual meter milli-voltmeter

• Measuring point

• FEX, FEY

• Test disc and setting

• TCD-782 (or SONY TYPE 4)
• Normal mode

• Adjustment position

• VR356(FG)

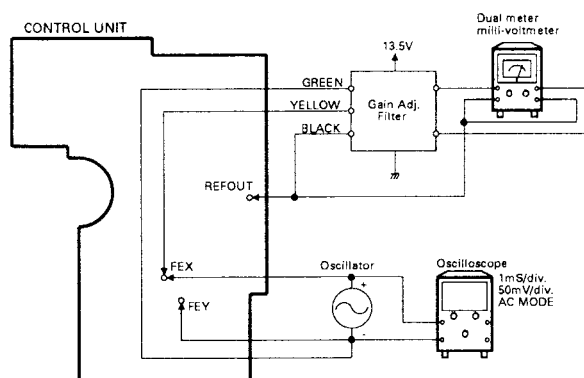


Fig. 39

Adjustment Procedure

1. After checking that the power is OFF, connect the gain adjustment filter and measuring equipment as shown in the above diagram.
2. Play tune TNO 19 in normal mode. (TYPE 4: TNO 14)
3. Set the oscillator to 1kHz, and observe the FEX/FEY output in the oscilloscope. Adjust the oscillator output to obtain a FEX/FEY output of 100mVp-p.
4. Adjust VR356(FG) to obtain a milli-voltmeter difference of 0 ± 0.5 dB.

5.9 Tracking Servo Loop Gain Adjustment

• Purpose:

To adjust the tracking servo loop gain to an optimum value.

• Maladjustment symptoms:

Poor playability, reduced resistance to vibration.

• Measuring equipment / jigs

• Oscillator, gain adjustment filter (GGF-065), dual meter milli-voltmeter.

• Measuring point

• TEX, TEY

• Test disc and setting

• TCD-782 (or SONY TYPE 4)
• Normal mode

• Adjustment position

• VR354(TG)

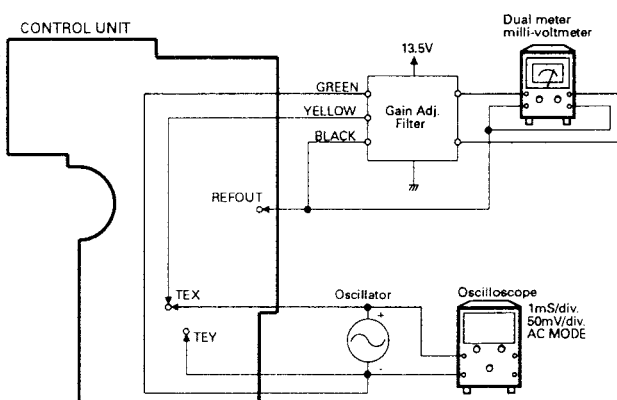


Fig. 40

Adjustment Procedure

1. After checking that the power is OFF, connect the gain adjustment filter and measuring equipment as shown in the above diagram.
2. Play tune TNO 19 in normal mode. (TYPE 4: TNO 14)
3. Set the oscillator to 1.4kHz, and observe the TEX/TEY output in the oscilloscope. Adjust the oscillator output to obtain a TEX/TEY output of 300mVp-p.
4. Adjust VR354(TG) to obtain a milli-voltmeter difference of 0 ± 0.5 dB.

5.10 TE Offset Adjustment-2

• **Purpose:**

To adjust the electrical offset of the tracking servo to zero.

• **Maladjustment symptoms:**

Search times too long, carriage run-away.

• **Measuring equipment / jigs** • DC voltmeter

• **Measuring point** • TEY

• **Test disc and setting** • No Disc
• Test mode

• **Adjustment position** • VR353

Adjustment Procedure

Same as for TE offset adjustment-1, but with the DC voltage of the TEY output adjusted to $0 \pm 50\text{mV}$.

The purpose of this additional adjustment is to correct any deviations generated when carrying out the tracing balance and tracking servo loop gain adjustments after completing TE offset adjustment-1.

5.11 Tracking Balance Adjustment-2

• **Purpose:**

To adjust the tracking servo offset to zero.

• **Maladjustment symptoms:**

Search times too long, poor playability, carriage run-away.

• **Measuring equipment / jigs** • Oscilloscope.

• **Measuring point** • TEY

• **Test disc and setting** • TCD-782 (or SONY TYPE 4)
• Test mode

• **Adjustment position** • VR351

Adjustment Procedure

Steps 1 thru 5 same as tracking balance adjustment-1.

6. Check that the level difference between the positive and negative amplitudes of the TEY signal is within 5% (See Fig. 36-38). If greater than 5%, adjust with VR351.

7. If further adjustment was necessary in step 6, repeat TE offset adjustment-2.

5.12 Tuner Adjustment

●Connection Diagram

NOTICE:
Select C1 so that total capacity of 80pF is attained from the direction of the receiver jack.
Z: Output impedance of SSG.

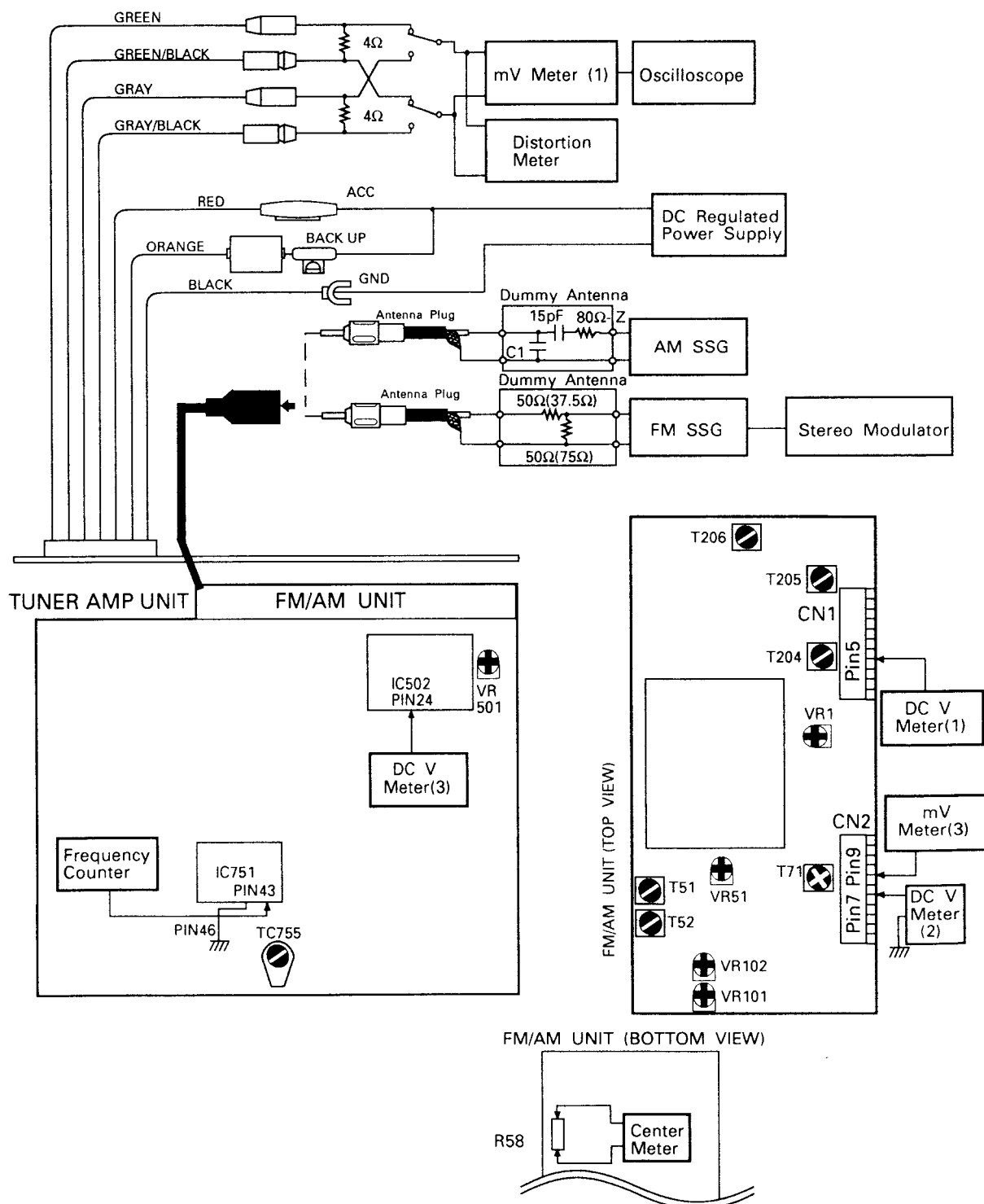


Fig. 41

FM ADJUSTMENT * Stereo MOD.:1kHz,L+R=90%,Pilot=10%

	No.	FM SSG(400Hz,100%)		Displayed Frequency (MHz)	Adjusting Point	Adjustment Method (Switch Position)
		Frequency(MHz)	Level(dBμV)			
IF	1	98.095	60	98.1	T51	Center Meter:0
	2	98.095	60	98.1	T52	Distortion Meter:Minimum
	3	Repeat No.1-2 alternately so that the center meter indicates the 0 output and distortion meter indicates minimum output.				
IFT	1	98.1	60	98.1	T71	mV Meter(3):Minimum
Soft	1	98.1	60	98.1	—	mV Meter(1):A dB
Mute	2	98.1	9	98.1	VR102	mV Meter(1):A -3dB
ARC	1	98.1s	33	98.1	VR101	mV Meter(1):Separation 5dB
SD	1	98.1s	15	98.1	VR51	DC V Meter (2):Approx.5V
LOCH	1	98.1s	53	98.1	VR1	DC V Meter(2):Approx.5V

AM ADJUSTMENT *:ES model when tunig step at 9kHz

	No.	AM SSG(400Hz,30%)		Displayed Frequency (kHz)	Adjusting Point	Adjustment Method (Switch Position)
		Frequency(kHz)	Level(dBμV)			
Tuning Volt	1	—	—	1,710(EW,UC) *(1,602)	—	Verify that DC V Meter (1) is less than 6.5V.
	2	—	—	153(EW) 530(UC) *(531)	—	Verify that DC V Meter (1) is more than 2.0V.
IF	1	999(EW) 1000(UC) *(999)	15	999(EW) 1000(UC) *(999)	T204,205,206	mV Meter(1):Maximum

CLOCK ADJUSTMENT

No.	Adjustment Pint	Adjustment Method
1		Pin43 of IC751 connect to GND.
2	TC755	Frequency Counter :1.048576MHz±2Hz

RDS * Stereo MOD.:1kHz,Lch=90%,Pilot=10%

	No.	FM SSG(400Hz,100%)		Displayed Frequency (MHz)	Adjusting Point	Adjustment Method (Switch Position)
		Frequency(MHz)	Level(dBμV)			
RDS	1	106.1	47	106.1	VR501	DC V Meter(3):2.3±0.1V
IFT	2	98.1*	60	98.1	T71	Stereo Distortion is minimum

●New Test Mode (aging operation and setup analysis)

The CD, either single or multiple, plays in the normal mode. After being set up, it will display FOK (focus), LOCK (spindle), subcode, sound skip, protection against a mechanical error or the like, occurrence of an error, cause and time of an expiry, if any, (and disc number in the multi-mode).

During the setup, the CD software operation status (internal RAM and C-point) is displayed.

The software on the head unit side does not involve any special problem but runs normally.

(1) How to Put in the NEW TEST Mode

See the test mode flow chart page 21.

(2) Relations of keys between TEST and NEW TEST Modes.

P-BUS Commands	Keys	Test Mode Regulator OFF	Regulator ON	New Test Mode Play in progress	New Test Mode Error Protection } Talking place
B0	REL/ BAND	Regulator ON	Regulator OFF	(REL/BAND)	Time of occurrence } Cause of error } Selected
B1	TRACK+	---	FWD-KICK	TRACK+	---
B2	TRACK-	---	REV-KICK	TRACK-	---
B3	SCAN	---	TRACKING CLOSE	SCAN	---
B4	MODE	---	TRACKING OPEN	MODE	---
B5	ITP	---	FOCUS CLOSE	ITP	---
B6	---	---	FOCUS OPEN	---	---
B7	---	---	Jump-OFF	---	---
B8	TRACK+ + TRACK-	To new Test Mode	Jump-Mode selected	TRACK+ + TRACK-	Occurrence T.No } Time of occurrence } Selected

Operations, such as EJECT, CD ON/OFF, etc. are to be performed normally

(3)Error Cause (Error Number) Code

Error Code	Classification	Mode	Description	Cause/Detail
40	ELECTRIC	PLAY	FOK=L100ms	Put out of focus
41	ELECTRIC	PLAY	LOCK=L100ms	Spindle unlocked
42	ELECTRIC	PLAY	Subcode unacceptable 500ms	Subcode fails to read
43	ELECTRIC	PLAY	Sound skipped	Last address memory operated

*The error code is identical with those in the normal mode.

(4) Indicating an Operation Status During Setup

Status No.	Description	Protection operation
01	Carriage home mode started	None
02	Carriage moving on the internal circumference	10-second time out
03	Carriage moving on the external circumference	10-second time out
11	Setup started	None
12	Spindle turn/Focus search started	None
13	Waiting for focus closing	Failure to focus closing
14	Spindle kicked and focus checked	Out of focus
15	Tracking closed and focus checked	Out of focus
17	Carriage closed and focus checked	Out of focus
18	Lock subcode } Waiting	Failure to lock, Subcode failed to read out of focus
19	End	None

(5) Example of 7-segment Display.

(a) SET UP in progress

TRACK MIN SEC

11 11 11

While in the TEST MODE, a status number is indicated in TNO, MIN and SEC.

TRACK

11

MIN SEC

11 11

(b) Operation (PLAY, SEARCH, etc.) in progress perfectly identical with that in the multi mode.

(c) Protection/Error upon occurrence

ERROR-XX While in the error mode, an error number is displayed in MIN and SEC.

Select the display with the REL/BAND key.

TRACK MIN SEC

10 40 05

While in the PLAY MODE, an absolute time is indicated in TNO, MIN and SEC.

TRACK

10

MIN SEC

40 05

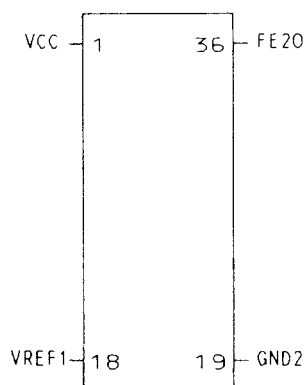
→ Select the display with the TRACK + + TRACK- key.

●ICs

●Pin Functions(UPC1347GS)

Pin No.	Pin Name	I/O	Output Format	Function and Operation
1	VCC			
2	BP-	I		Vibration detect amplifier 1 inverter input
3	BPO	O		Vibration detect amplifier 1 output
4	WC+	I		Window comparator non-inverting input
5	WC-	I		Window comparator inverting input
6	GND			GND
7	QDH	I		Vibration detect amplifier 3 non-inverting input
8	QDO	O		Vibration detect amplifier 3 output
9	A	I		A signal input
10	C	I		C signal input
11	B	I		B signal input
12	D	I		D signal input
13	E	I		E signal input
14	F	I		F signal input
15	PIN	I		APC circuit PD amplifier input
16	LA	O		APC circuit LD amplifier output
17	LAON			Laser diode ON/OFF switching
18	VREF1			Reference voltage
19	GND2			GND
20	RF+	I		RF amplifier non-inverting input
21	RFS	O		RF summing virtual output
22	RF-	I		RF amplifier inverting input
23	NC			Not used
24	RFO	O		RF amplifier output
25	APC-	I		APC circuit PD amplifier inverting
26	TE2+	I		Tracking error amplifier 2 non-inverting input
27	APCO	O		APC circuit PD amplifier output
28	TE1O	O		Tracking error amplifier 1 output
29	TE2-	I		Tracking error amplifier 2 inverting input
30	TE2O	O		Tracking error amplifier 2 output
31	VREF2			Reference voltage
32	FE2+	I		Focus error amplifier 2 non-inverting input
33	FE1+	I		Focus error amplifier 1 non-inverting input
34	FE1O	O		Focus error amplifier 1 output
35	FE2-	I		Focus error amplifier 2 inverter input
36	FE2O	O		Focus error amplifier 2 output

UPC1347GS

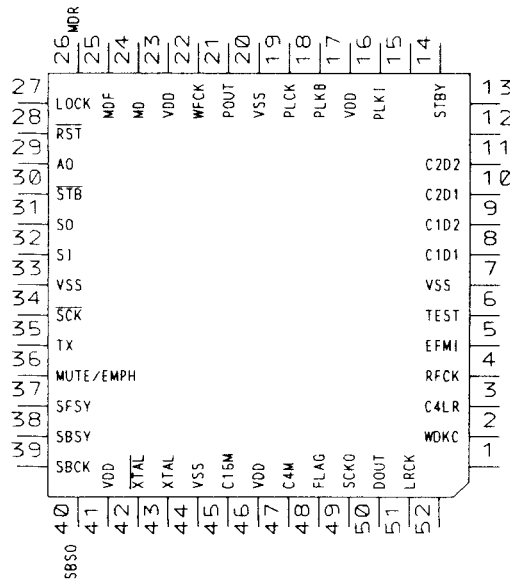


● Pin Functions(UPD6375GC)

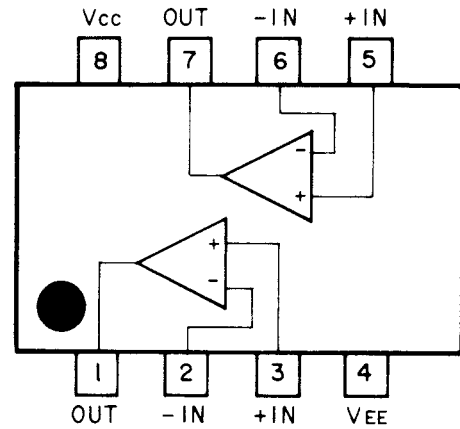
Pin No.	Pin Name	I/O	Output Format	Function and Operation
1	NC			Not used
2	WDCK	O		Output terminal for signal having double the frequency of LRCK
3	C4LR	O		Output terminal for signal having four the frequency of LRCK
4	RFCK	O		Oscillation clock divider signal,output pin for signal giving 1-frame sync.
5	EFMI	I		EFM signal input terminal
6	TEST			Test terminal
7	VSS			Gnd
8	C1D1	O		Output terminal indicating C1 error correction status
9	C1D2	O		Output terminal indicating C1 error correction status
10	C2D1	O		Output terminal indicating C2 error correction status
11	C2D2	O		Output terminal indicating C2 error correction status
12,13	NC			Not used
14	STBY	I		Standby input terminal
15	NC			Not used
16	PLK1	O		VCO output terminal for use in analog PLL selection
17	VDD			5V
18	PLK8	I		VCO output terminal for use in analog PLL selection
19	PLCK	O		Bit clock monitor terminal
20	VSS			Gnd
21	POUT	O		Output terminal for phase comparison between EFM signal and bit clock
22	WFCK	O		Signal issuing one-frame period by bit clock dividing signal
23	VDD			5V
24	MDS	O		Signal indicating spindle motor CLV servo control output status
25	MDF	O		Spindle motor CLV servo control positive direction output terminal
26	MDR	O		Spindle motor CLV servo control negative direction output terminal
27	LOCK	O		"H" when synchronization signal & frame counter output coincide at EFM demodulator
28	RST	I		Reset signal input terminal
29	A0	O		Control signal distinguishing data from microcomputer
30	STB	I		Signal latching serial data inside LSI
31	SO			Serial data input terminal
32	SI	I		Input terminal for data from microcomputer
33	VSS			Gnd
34	SCK	I		Clock input terminal serial data input
35	TX	O		Digital audio interface data output terminal
36	MUTE/EMPH	O		Output for mute command decoding signal or sub-Q commpand pre-emphasis data
37	SFSY	O		Signal indicating subcode one-frame synchronization
38	SBSY	O		Signal indicating head of subcode block
39	SBCK	I		Subcode data read clock input terminal
40	SBSO	O		Subcode data output terminal
41	VDD			5V
42	XTAL	O		Oscillation continuation terminal
43	XTAL	I		Oscillation continuation terminal
44	VSS			Gnd
45	C16M	O		Oscillation clock output terminal
46	VDD			5V
47	C4M	O		1/4 cycle output terminal for oscillation clock signals
48	FLAG	O		Flag sig. indicating that the current audio data output of incorrectable data
49	SCKO	O		Clock output terminal for audio serial data
50	DOUT	O		Serial audio data output terminal
51	LRCK	O		Signal distinguishing between left and right channel DOUT terminal output
52	NC			Not used

IC's marked by* are MOS type.
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

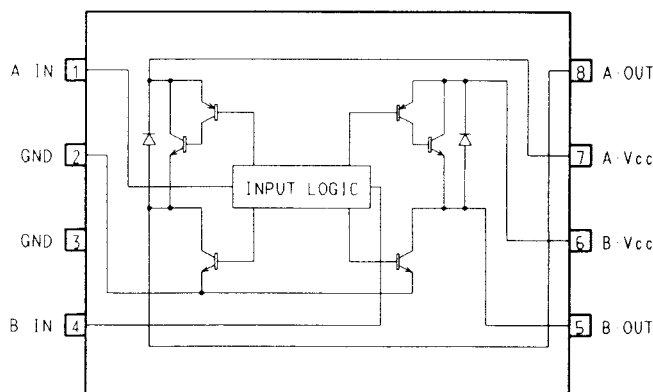
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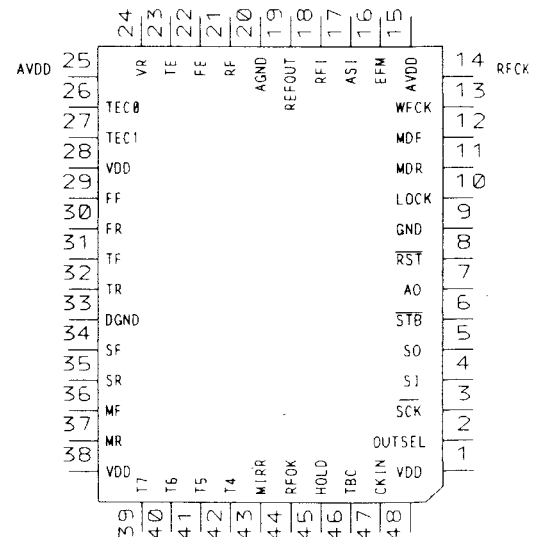
XRA4558F UPC4570G NJM4558MD



MB3854PF



*UPD6374AGH



● Pin Functions(UPD6374AGH)

Pin No.	Pin Name	I/O	Output Format	Function and Operation
1	VDD			Power supply
2	OUTSEL	I		Sets PWM output mode for the motor system
3	SCK	I		Clock input terminal for serial data input and output
4	SI	I		Serial data input
5	SO	O		Serial data and status signal output
6	STB	I		Signal latching serial data inside LSI
7	A0	I		Used in combination with stb A0 = "L" : Set in address register when $\overline{\text{STB}}$ is active A0 = "H" : Parameter setting when STB is active
8	RST	I		System reset
9	DGND			Logic circuit GND terminal
10	LOCK	I		Input terminal for detection of spindle servo error signal
11	MDR	I		Input terminal for detection of spindle servo error signal
12	MDF	I		Input terminal for detection of spindle servo error signal
13	WFCK	I		Input terminal for detection of spindle servo error signal
14	RFCK	I		Input terminal for detection of spindle servo error signal
15	AVDD			Positive power supply terminal for analog circuit
16	EFM	O		EFM signal output terminal
17	ASI	I		Level comparing input for RF signal comparison
18	RFI	I		Analog input terminal for EFM comparator
19	REFO	O		A/D converter midpint output terminal inside LSI
20	AGND			Analog circuit GND
21	RF	O		RF signal input terminal
22	FE	I		Focus error terminal
23	TE	I		Tracking error input terminal
24	VR	I		Input signal is quantified as follows:FS=88.2kHz,Resolution:6 bits The output takes place directly at microcomputer interface, that is, not via the filter block within LSI
25	AVDD			Positive power supply terminal for analog circuit
26	TECO	I		Tracking comparator input terminal
27	TECI	I		Tracking comparator input terminal
28	DVDD			Positive power supply terminal for logic circuit
29	FF	O		PWM positive output terminal for the focus loop filter
30	FR	O		PWM negative output terminal for the focus loop filter
31	TF	O		PWM positive output terminal for the tracking loop filter
32	TR	O		PWM negative output terminal for the tracking loop filter
33	DGND			Logic circuit GND terminal
34	SF	O		PWM positive output terminal for the thread loop filter
35	SR	O		PWM negative output terminal for the thread loop filter
36	MF	O		PWM positive output terminal for the spindle loop filter
37	MR	O		PWM negative output terminal for the spindle loop filter
38	DVDD			Positive power supply terminal for logic circuit
39	T7	I		Sets tracking PWM output mode
40	T6	I		Sets focus PWM output mode
41	T5	I		Selects motor modulation mode
42	T4	I		Selects between focus and tracking modulation mode
43	MIRR	O		MIRR detection signal output terminal
44	RFOK	O		RFOK detection signal terminal
45	HOLD	I		Hold control signal input terminal
46	TBC			Tracking bank switching terminal
47	CKIN	I		System clock input terminal
48	TEST	I		Test terminal

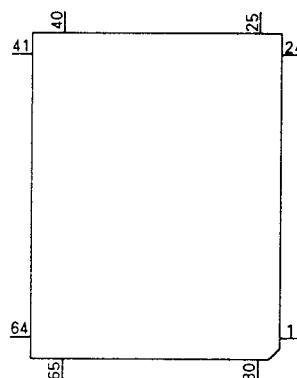
● Pin Functions(PD5184B)

Pin No.	Pin Name	I/O	Output Format	Function and Operation
1	NC			Not used
2	TEMP	I		Temperature detector
3	VDSENSE2	I		Short sense input
4	DCD	O	NM	Command/data appointment output
5	DCS	O	NM	Chip select output
6	DRDY	I		Ready input
7	DRST	O	NM	Reset output
8	A0	O	NM	Control signal distinguishing data from microcomputer
9	XSCK	O	NM	LSI clock output
10	XSO	O	NM	LSI data output
11	XSI	I		LSI data input
12	STB	O	C	LSI Strobe output
13	RST	O	C	Reset output pin
14	ENDOUT	O	C	Digital output enable signal
15	PEE	O	C	Beep tone output
16,17	NC			Not used
18	BRST	I		Bus communication reset input pin
19	BSRO	O	C	Bus communications service request output pin
20	BRXEN	I/O	C	Bus communication reception enable input pin
21	BSCK	I/O	C	Bus serial clock input/output
22	BSO	O	C	Serial data output pin
23	BSI	I		Bus serial data input
24	EJSW	I		Eject signal input
25	REMIN	I		Remote control pulse input
26	CNVSS			GND
27	RESET	I		Reset input
28	FECNT	O	C	FE output control pin
29	NC			Not used
30	XIN	I		Crystal oscillating element connection pin
31	XOUT	O	C	Crystal oscillating element connection pin
32	VSS			Gnd
33-40	NC			Not used
41	POWER	O	C	CD +5V control
42	CONT	O	C	Servo driver power supply control
43,44	NC			Not used
45	VDSENS	I		VD over voltage sense input
46	VDCONT	O	C	VD control input
47	DSET	O	C	Disc set indicator control output
48	BLGT	O	C	LCD back light control output
49	VMC	O	C	Loading motor driver power supply
50	EJ	O	C	Loading motor EJECT control
51	LOAD	O	C	Loading motor LOAD control
52	NC			Not used
53	DINC	I		Disc insert sense input
54	EJTD	I		Disc eject position sense input
55	CLAMP	I		Disc clamp sense input
56	NC			Not used
57	HOLD	O		Hold control output
58	TBC	O	C	Tracking bank switching output
59	NC			Not used
60	MIRR	I		Mirror detector input
61	LOCK	I		Spindle lock detector input
62	FOK	I		FOK signal input
63	HOME	I		Home position detector input
64-68	NC			Not used
69	OPTSW	I		Digital output ON/OFF input
70	CDMUTE	O	C	CD mute output
71	ADENA	O	C	A/D reference voltage output
72	TESTIN	I		Test program mode input

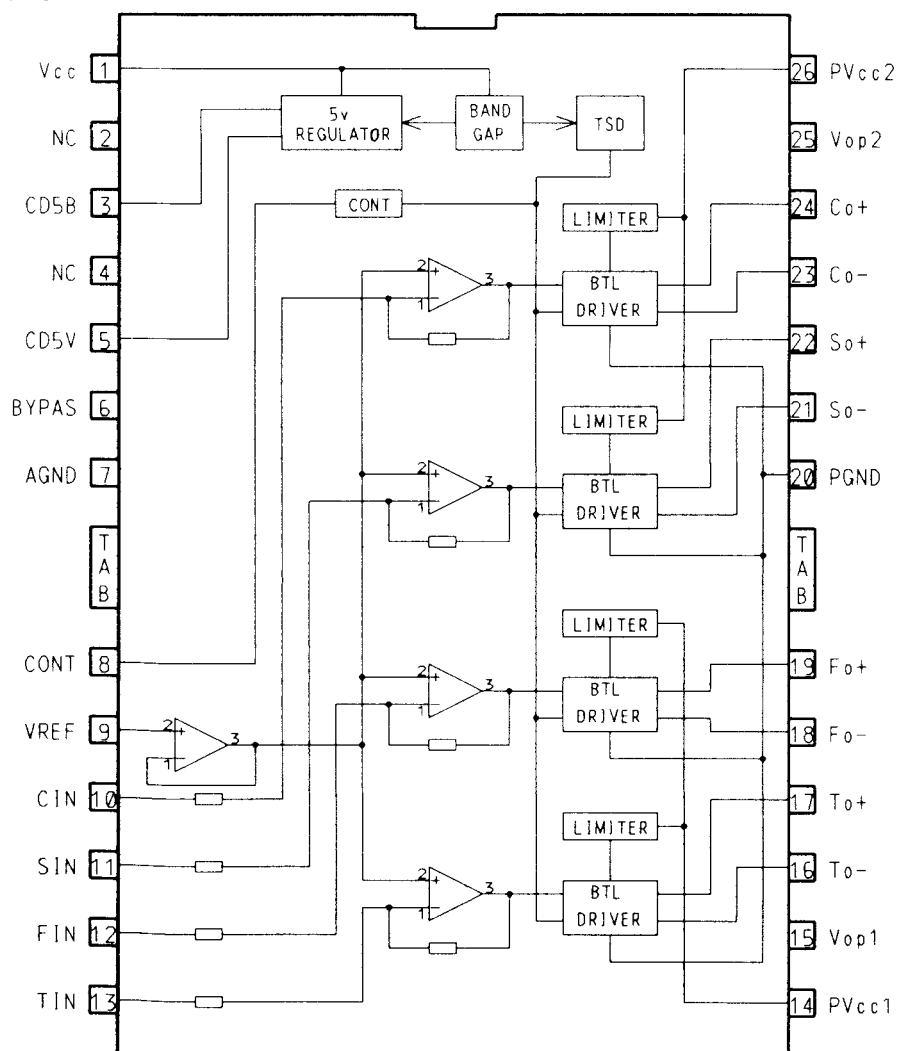
Pin No.	Pin Name	I/O	Output Format	Function and Operation
73	VCC			Back up 5V
74	VREF	I		A/D reference voltage input
75	AVSS			A/D GND
76	CSEL			Compression select
77,78	NC			Not used
79	KD0			Analog key input 0
80	KD1	I		Analog key input 1

Output Format	Meaning
C	CMOS output
NM	Middle resistivity N channel open drain

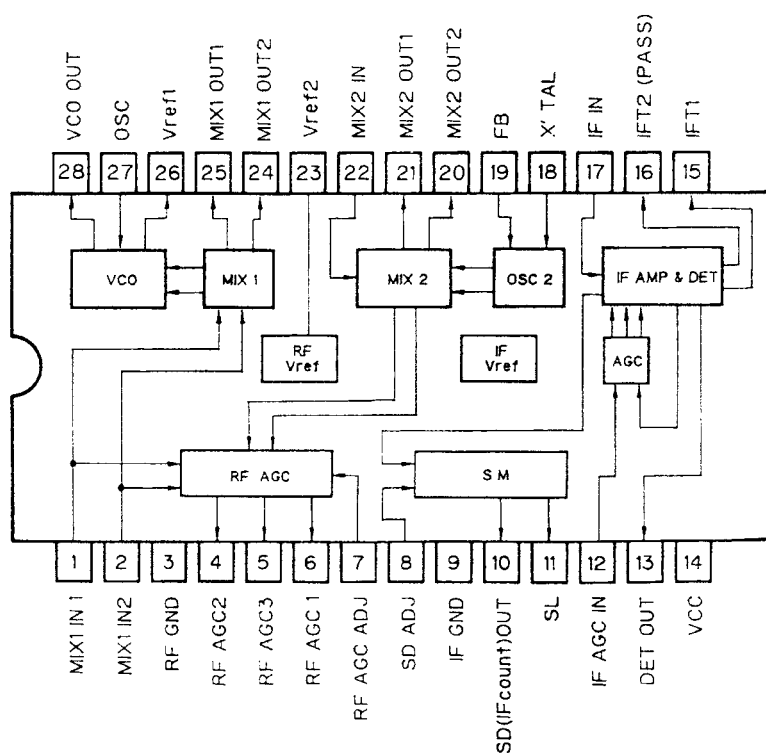
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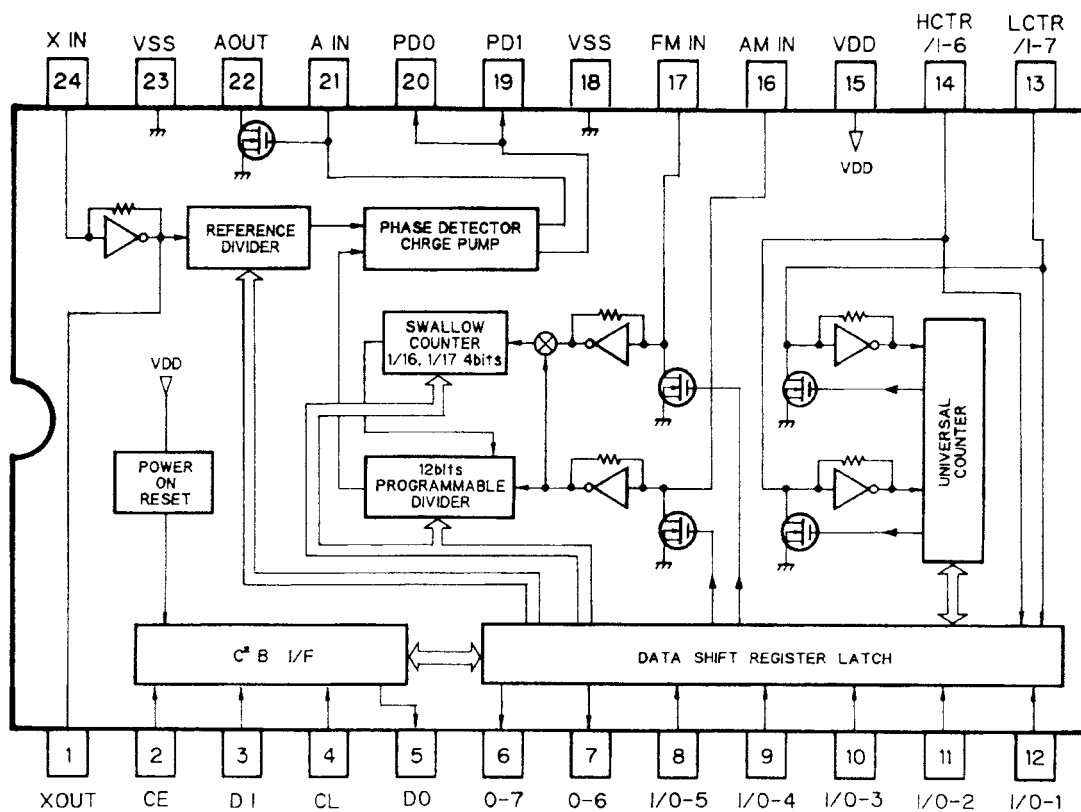
PA3026



PAF001A



LC72140M



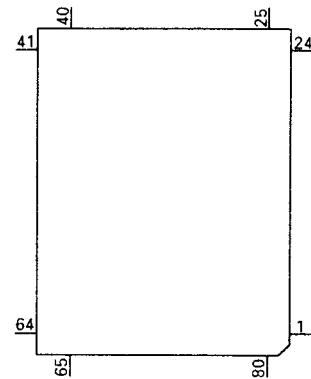
●Pin Functions(PD4414C)

Pin No.	Pin Name	I/O	Output Format	Function and Operation
1	SL	I		Signal level for tuner
2	AVREF	I		A/D converter reference voltage
3	VDD			5V
4	VDD			Power supply
5	DSPPW	O	C	Power supply for DSP
6	RDSSEN	O	C	Enable output for RDS IC
7	RDSSEL	O	C	Select output for RDS IC
8	RDSRST	O	C	Reset output for RDS IC
9	TUNPW	O	C	Tuner power control output
10	PCK	O	C	Serial clock output for PLL IC
11	PDO	O	C	Data output for PLL IC
12	PCE	O	C	Chip enable output for PLL IC
13-15	NC			Not used
16	LBUSY	I		Busy input for LCD driver
17	RDSDI	I		Serial data input for RDS IC
18	RSDSO	O	C	Serial data output RDS IC
19	RDSCK	O	C	Serial clock for RDS IC
20	PEE	O	C	Beep tone output
21	ADENA	O	C	AVREF enable output
22	LCS	O	C	Chip select output for LCD driver
23	LDT	O	C	Data output for LCD driver
24	LCK	O	C	Clock output for LCD driver
25	VLCDPW	O	C	Power supply control output for LCD driver
26	MMUTE	O	C	Mute output for CD-M
27	BLGTG	O	C	Green back light control output
28	BLGTA	O	C	Amber back light control output
29	TEL	I		TEL mute input
30	VDIN	I		VD sense input
31	ISENS	I		Illumination sense input
32	NC			Not used
33	GND			GND
34	MONO	O	NM	Forced mono output
35	NC			
36	TMUTE	O	NM	Tuner mute output
37	DSET	O	C	Disc set indicator control output
38	DILMG	O	C	Dual illumination green output
39	DILMA	O	C	Dual illumination amber output
40	BRST	O	C	P-BUS reset output
41	BRXEN	I/O	C	P-BUS reception enable input
42	MUTERQ	O	C	Request output for DSP mute
43	PCL	O	C	Crystal resonator adjustment output
44	SYSPW	O	C	System power supply control output
45	MUTE	O	C	Mute output
46	TESTIN	I		Test program strat input
47	BSENS	I		Back up power sense input
48	ASENS	I		ACC power sense input
49	REMIN	I		Key cord signal input
50	BSRQ	O	C	Bus communications service request output pin
51	BDATA	I/O	C	P-BUS serial data input/output
52	BSCK	I/O	C	P-BUS serial clock input/output
53	TENBL	I		Test enable input
54	GND			GND
55	XT1			Not used
56	XT2			Not used
57	IC			GND
58	X1			Crystal oscillator connection pin
59	X2			Crystal oscillator connection pin
60	RESET	I		Reset input
61-67	NC			Not used
68	CDRESET	O	NM	CD reset output
69	SIMK0	I		Model select input 0

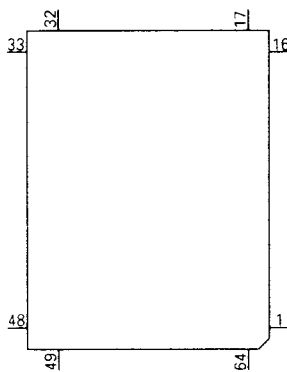
Pin No.	Pin Name	I/O	Output Format	Function and Operation
70	SIMK1	I		Model select input 1
71	NC			
72	NC			
73	AGND			Analog circuit GND
74	PDI	I		Data input for PLL IC
75	RDSRDY	I		Ready input for RDS IC
76	SD	I		SD input
77	DSENS	I		Grille detach sense
78,79	NC			Not used
80	TEMP	I		Temperature detector

Output Format	Meaning
C	CMOS output
NM	Middle resistivity N channel open drain

*PD4414C



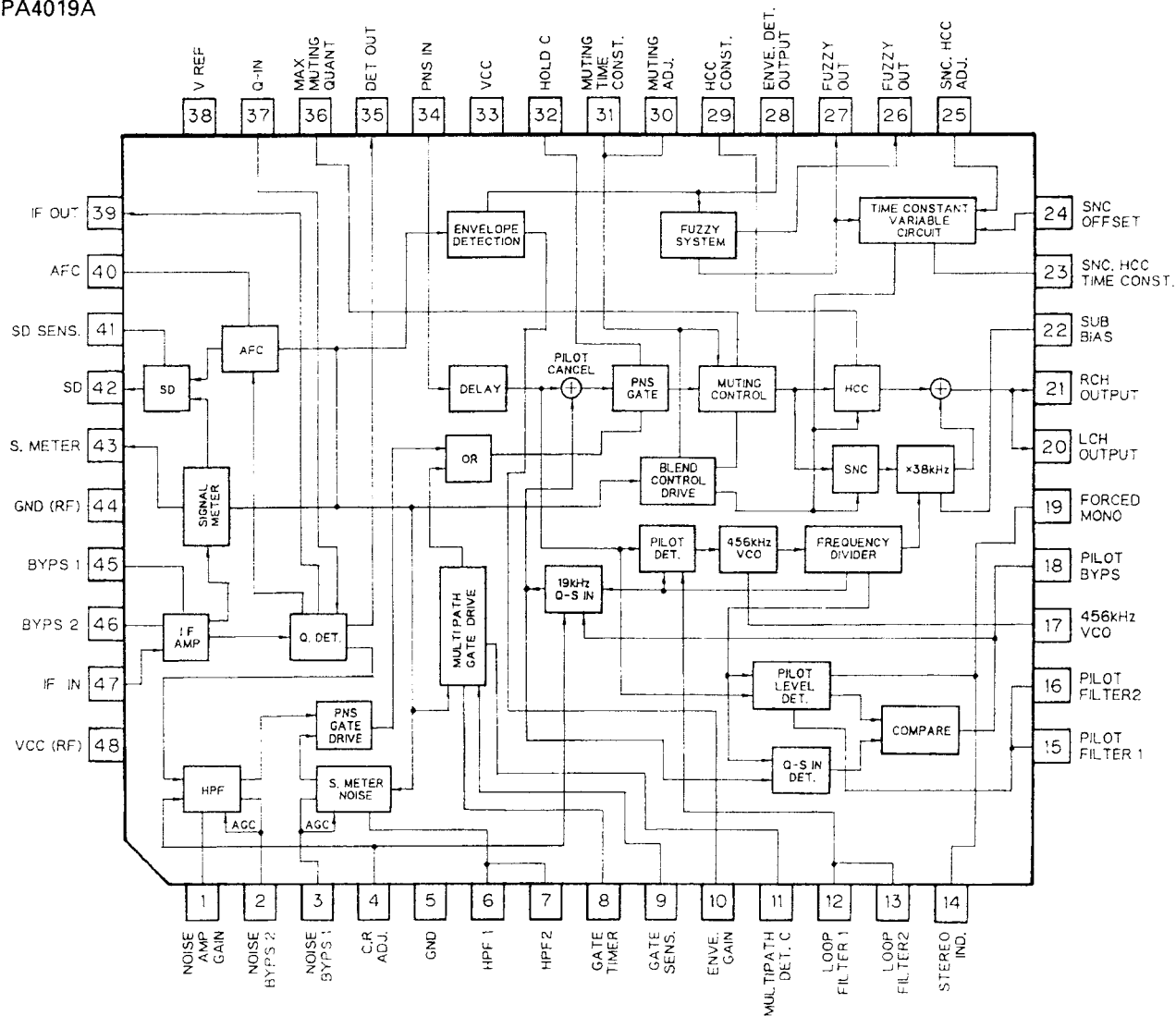
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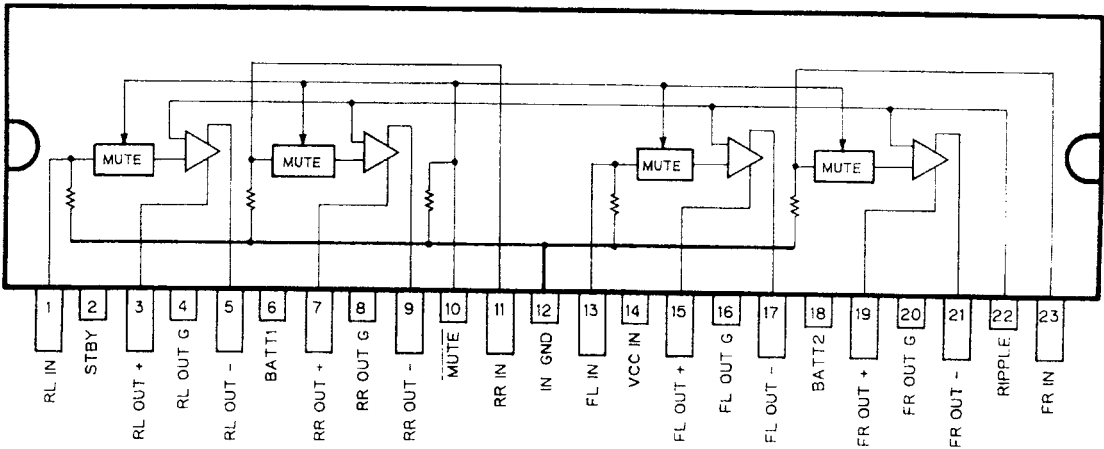
● Pin Functions(PDR002A)

Pin No.	Pin Name	I/O	Output Format	Function and Operation
1-9	SEG15-7	O		LCD segment output
10-16	KST/SEG	O		Key strobe /LCD segment output
17-20	KDT3-0	I		Key data input
21	REMIN	I		Remote control signal input
22	CE			Devise select input
23	VDD			Power supply
24	DISPCS	I		Display data communication chip select
25	KYDT	O		Remote control data output
26	GND			GND
27	X1			Crystal oscillator connection pin
28	X0			Crystal oscillator connection pin
29	DISPCK	I		Display data communication clock onput
30	DISPDT	I		Display data communication data input
31	BUSY	O		Display data communication busy output
32	VLCD			Power supply for LCD
33-36	COM0-3	O		Common output
37-64	SEG43-16	O		LCD segment output

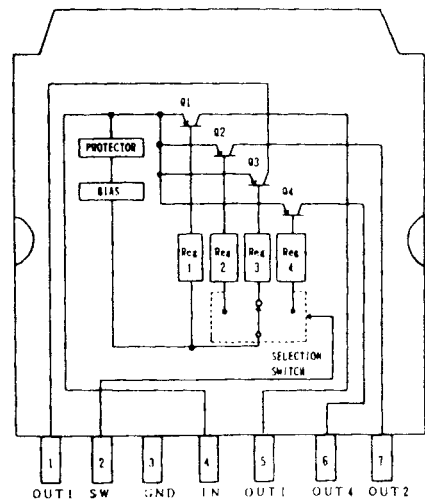
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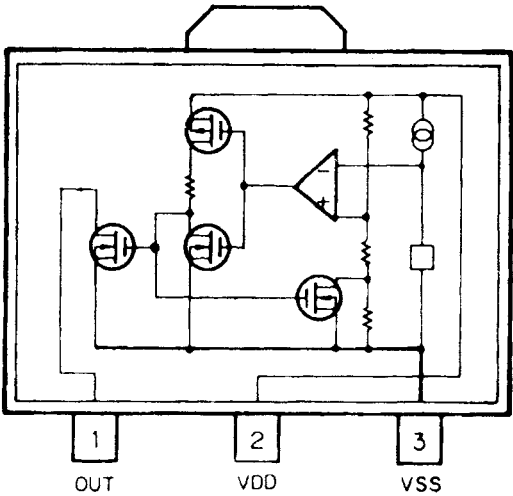
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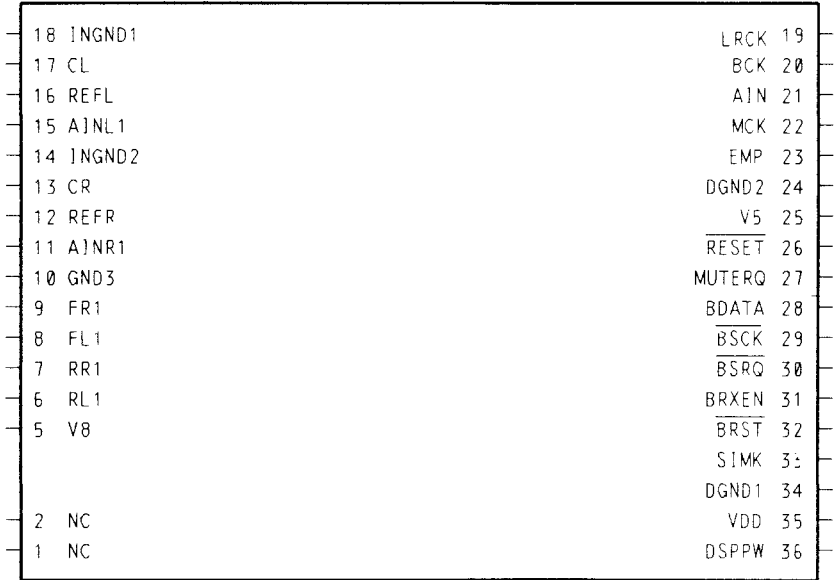
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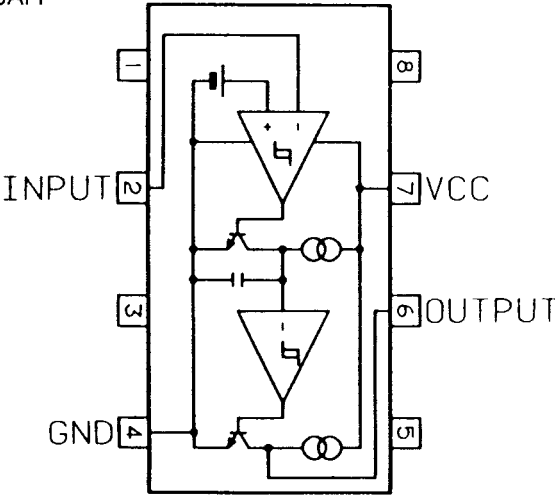
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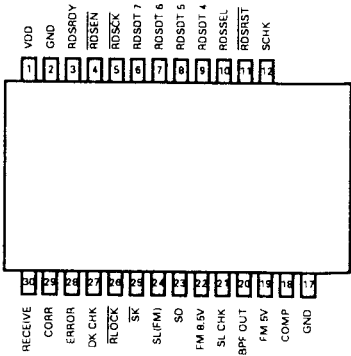
CWV1035



M51955AFP

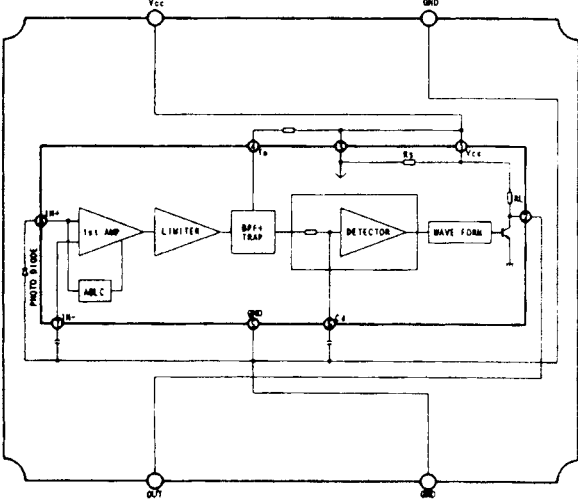
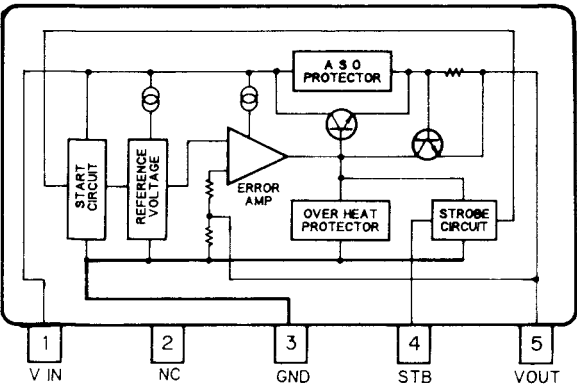


CWV1034



L780S05

RS-20



●FM Front End (CWB1065)

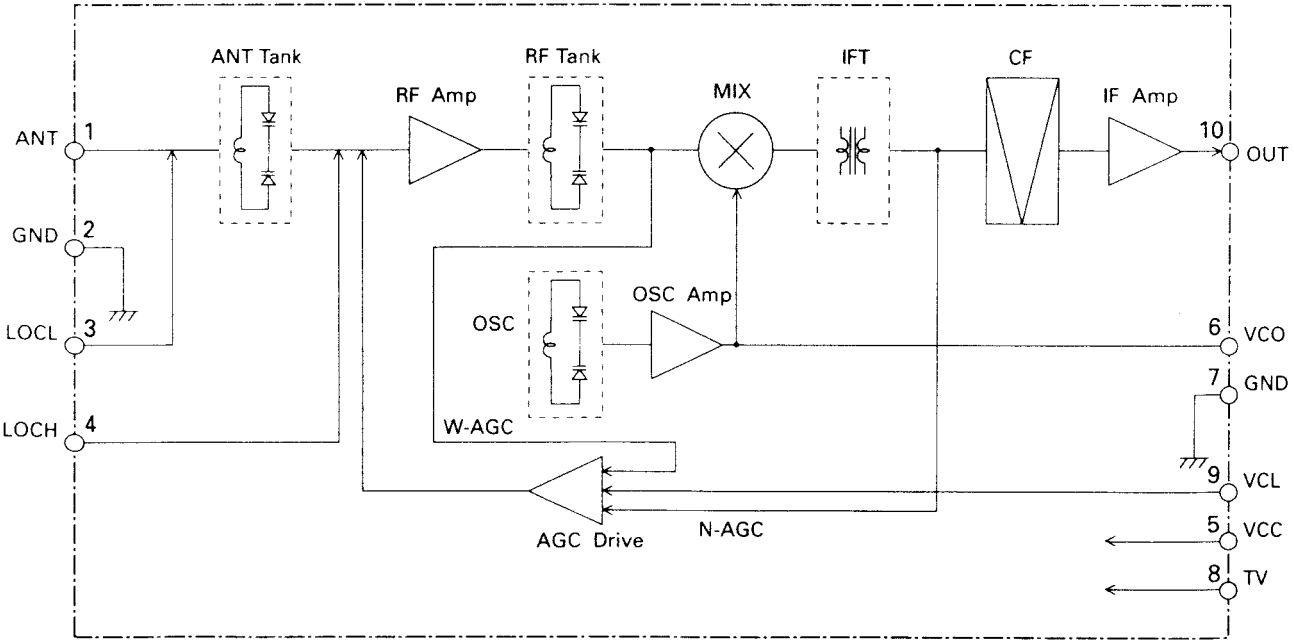
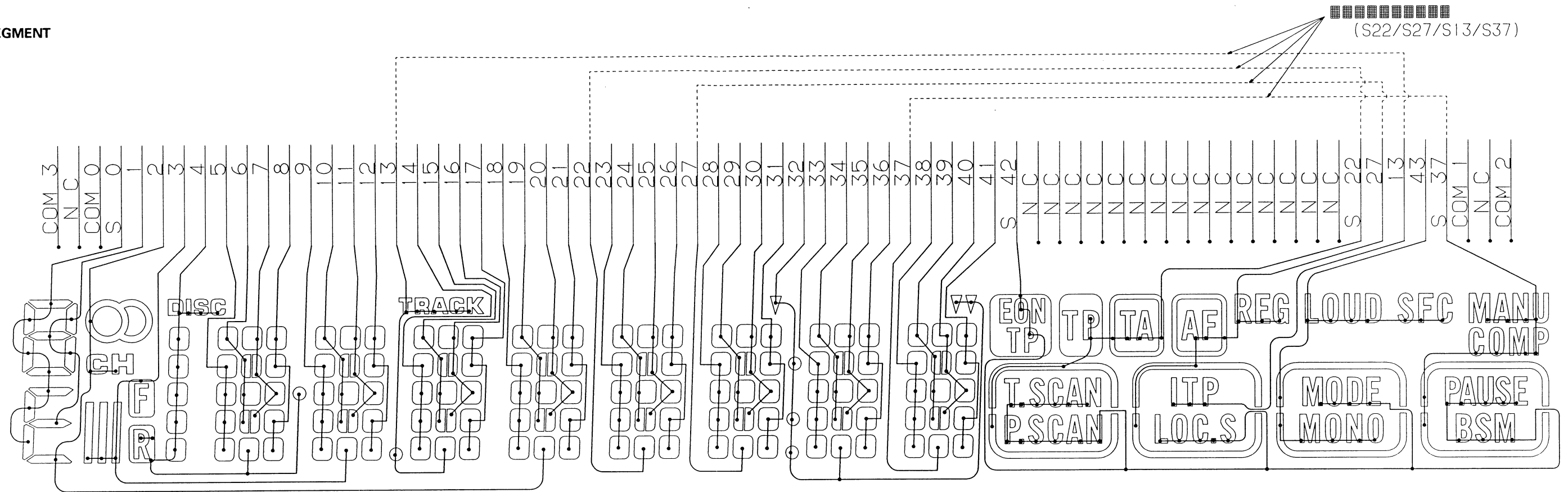


Fig. 42

●LCD (CAW1188)

SEGMENT



COMMON

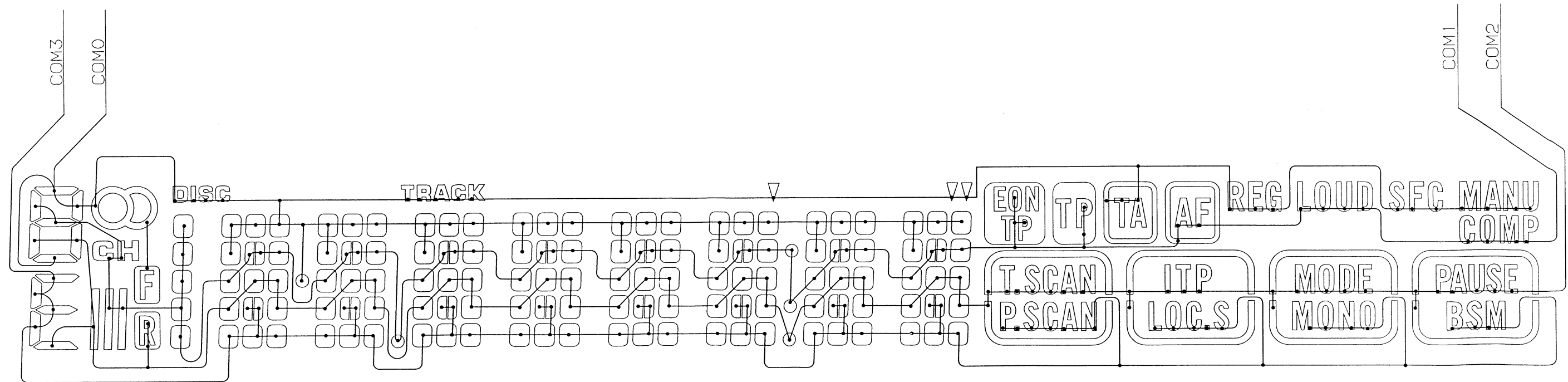
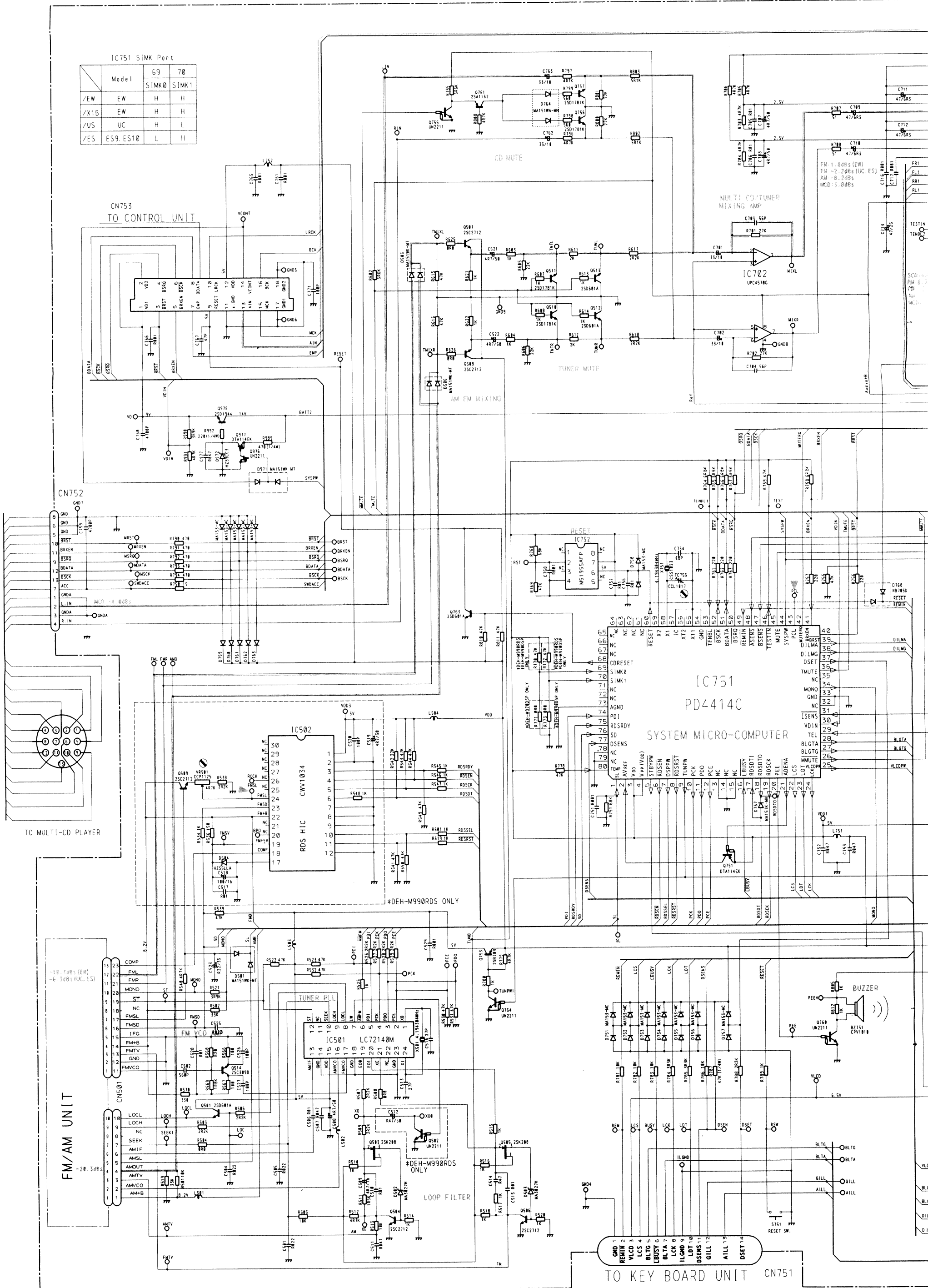


Fig. 43

7. SCHEMATIC CIRCUIT DIAGRAM

●TUNER AMP UNIT



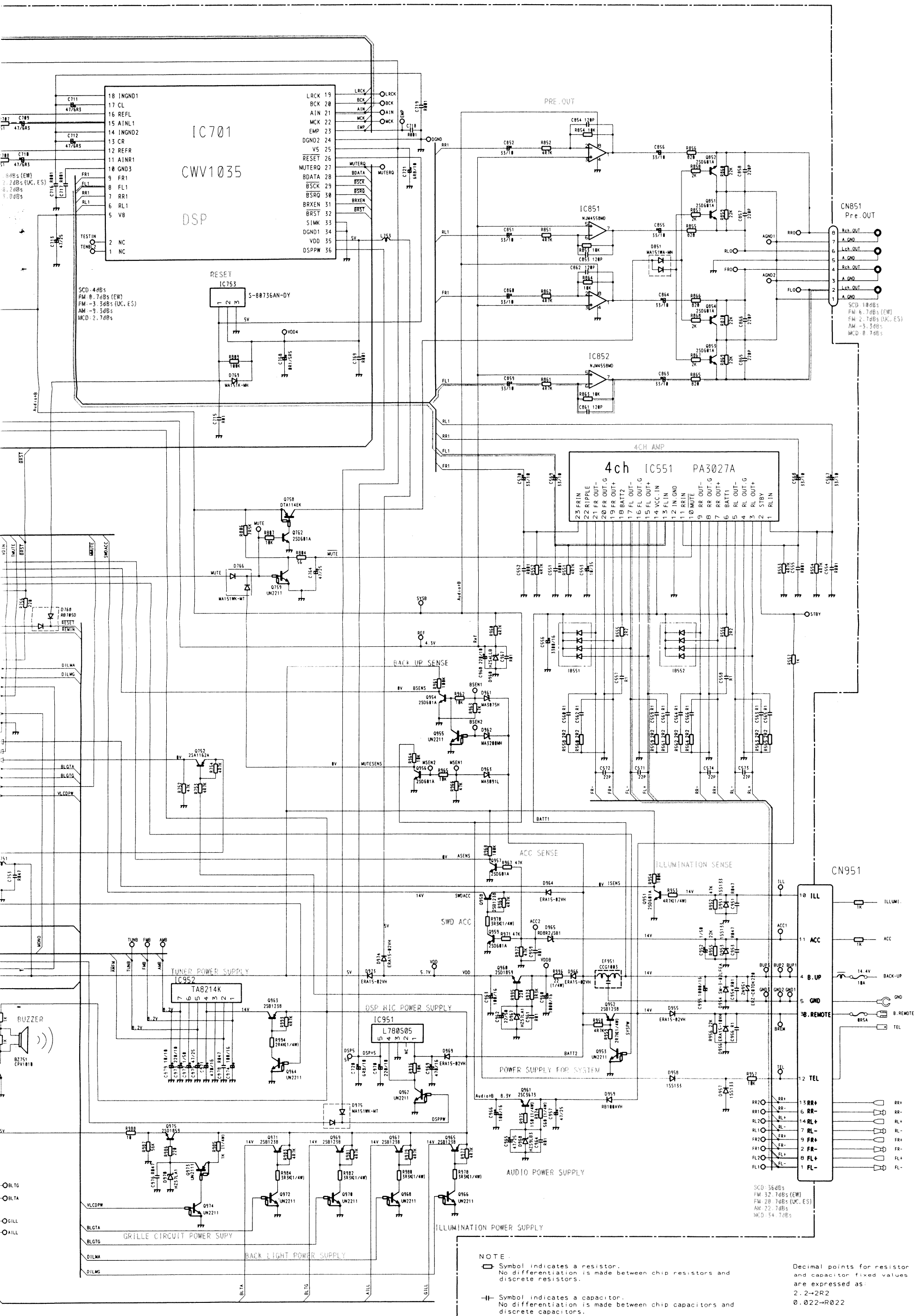


Fig. 45



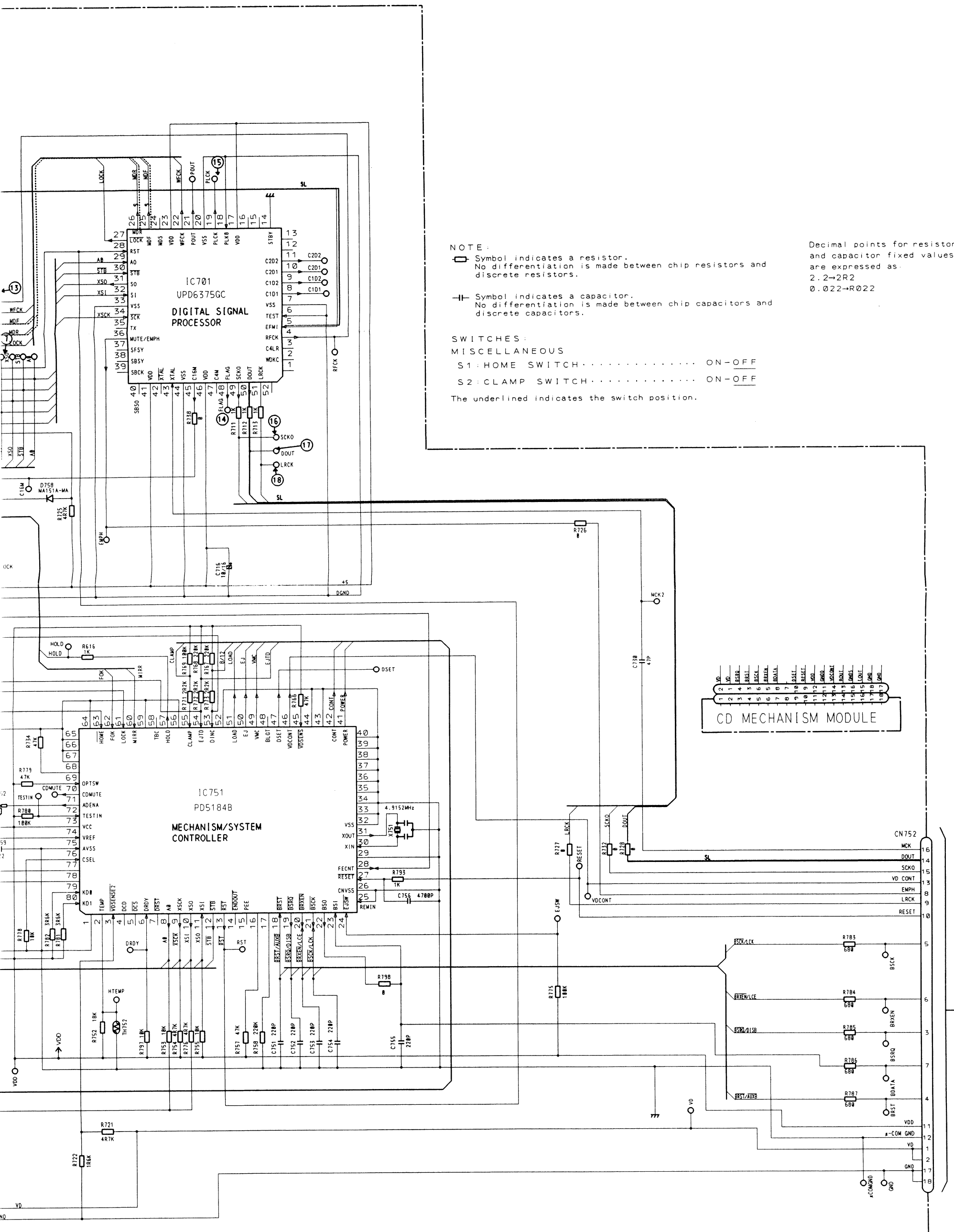
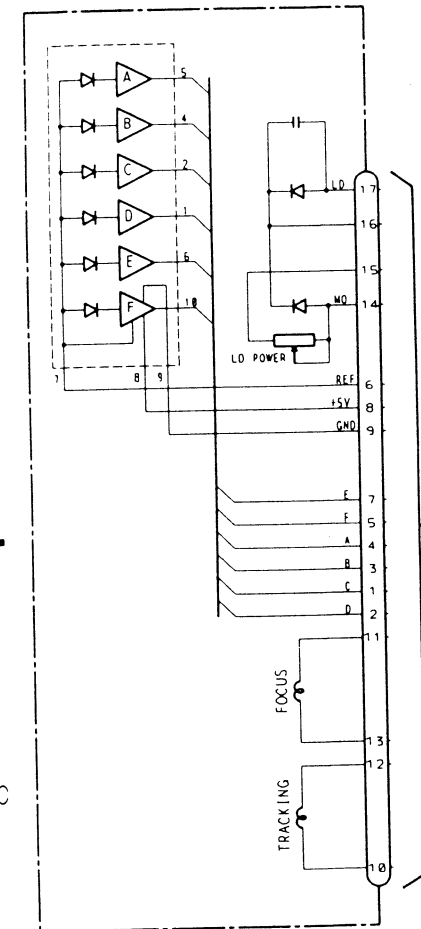


Fig. 46

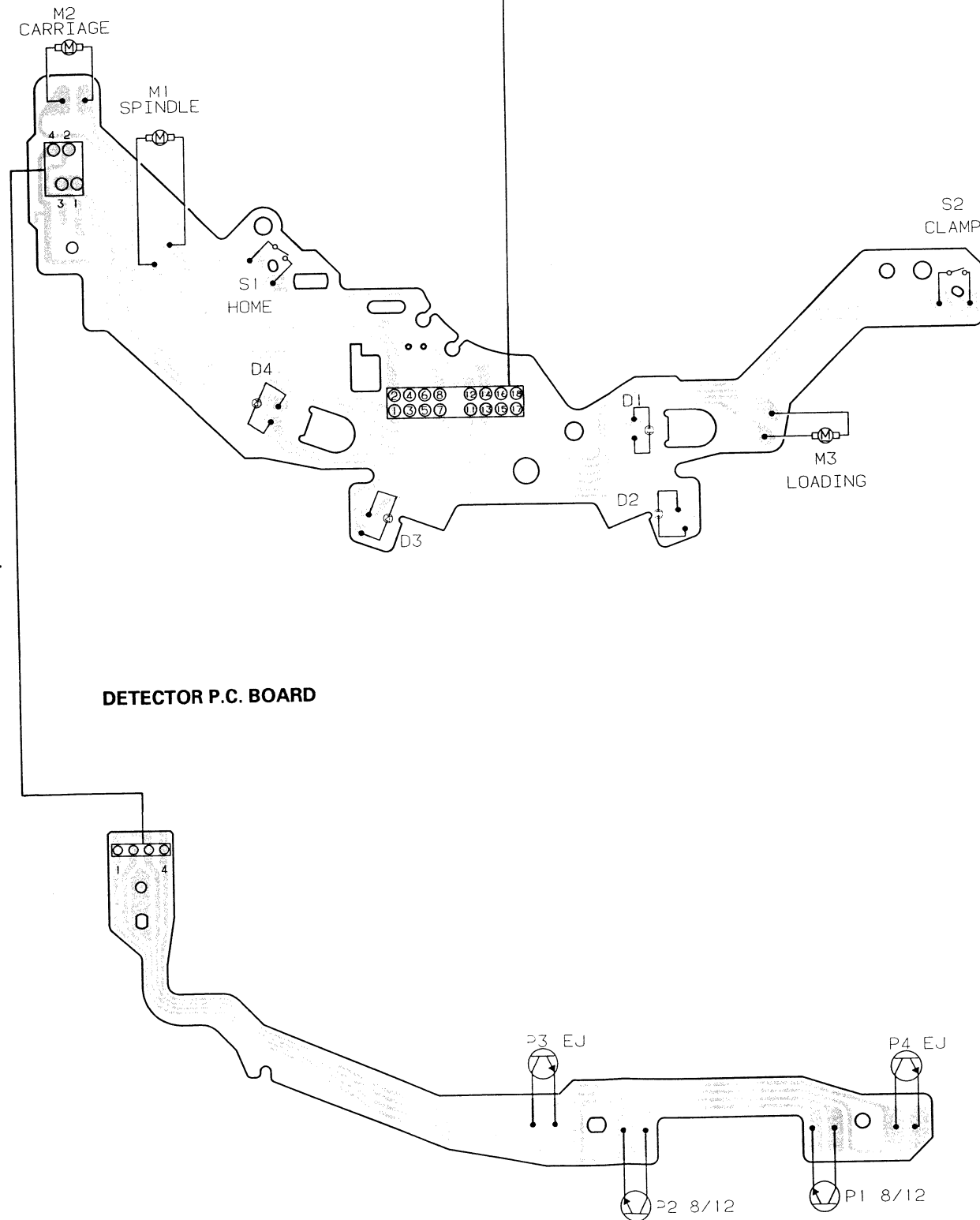
SWITCH P.C. BOARD

PU UNIT

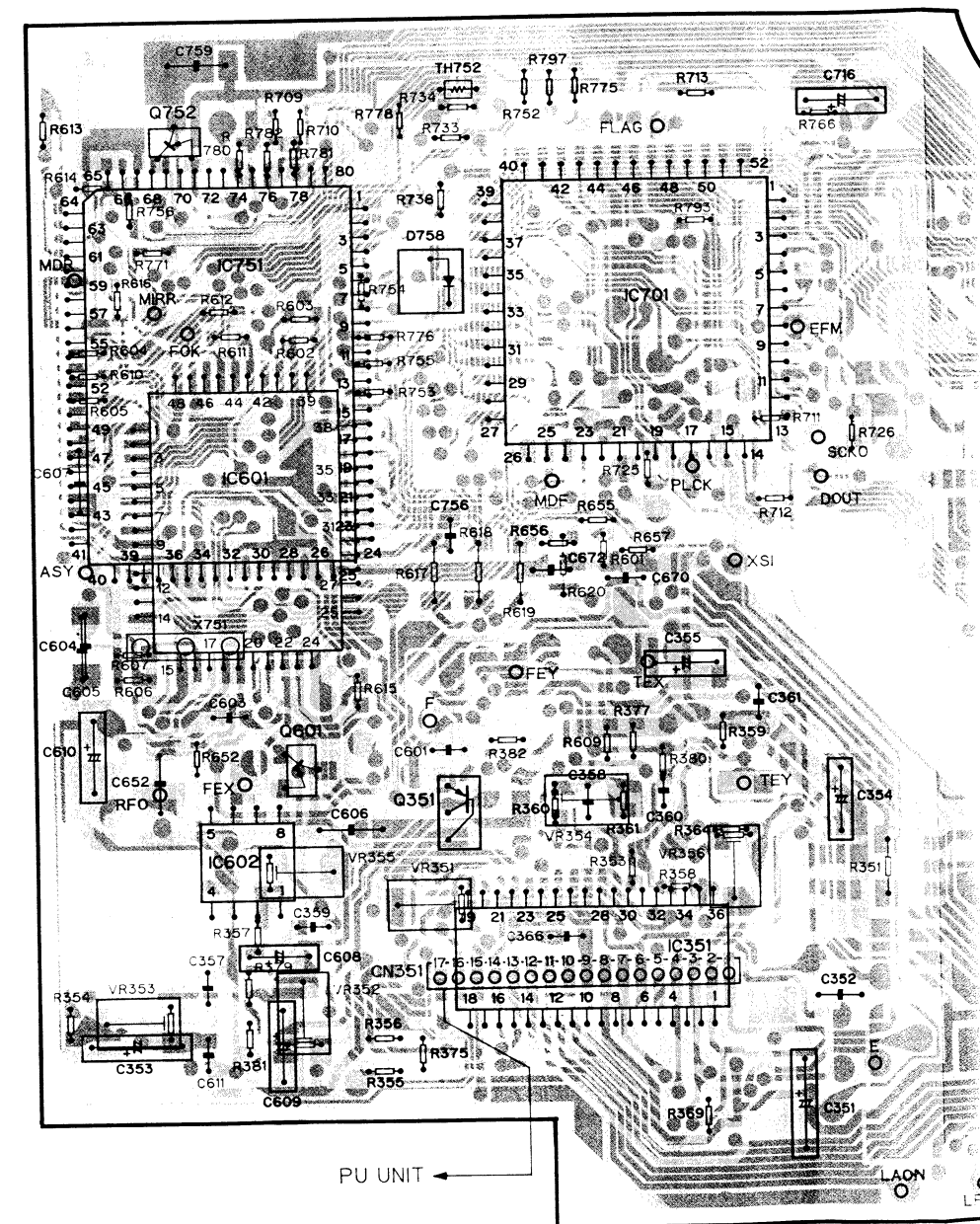


CONTROL UNIT
CN351

DETECTOR P.C. BOARD



CONTROL UNIT



PU UNIT

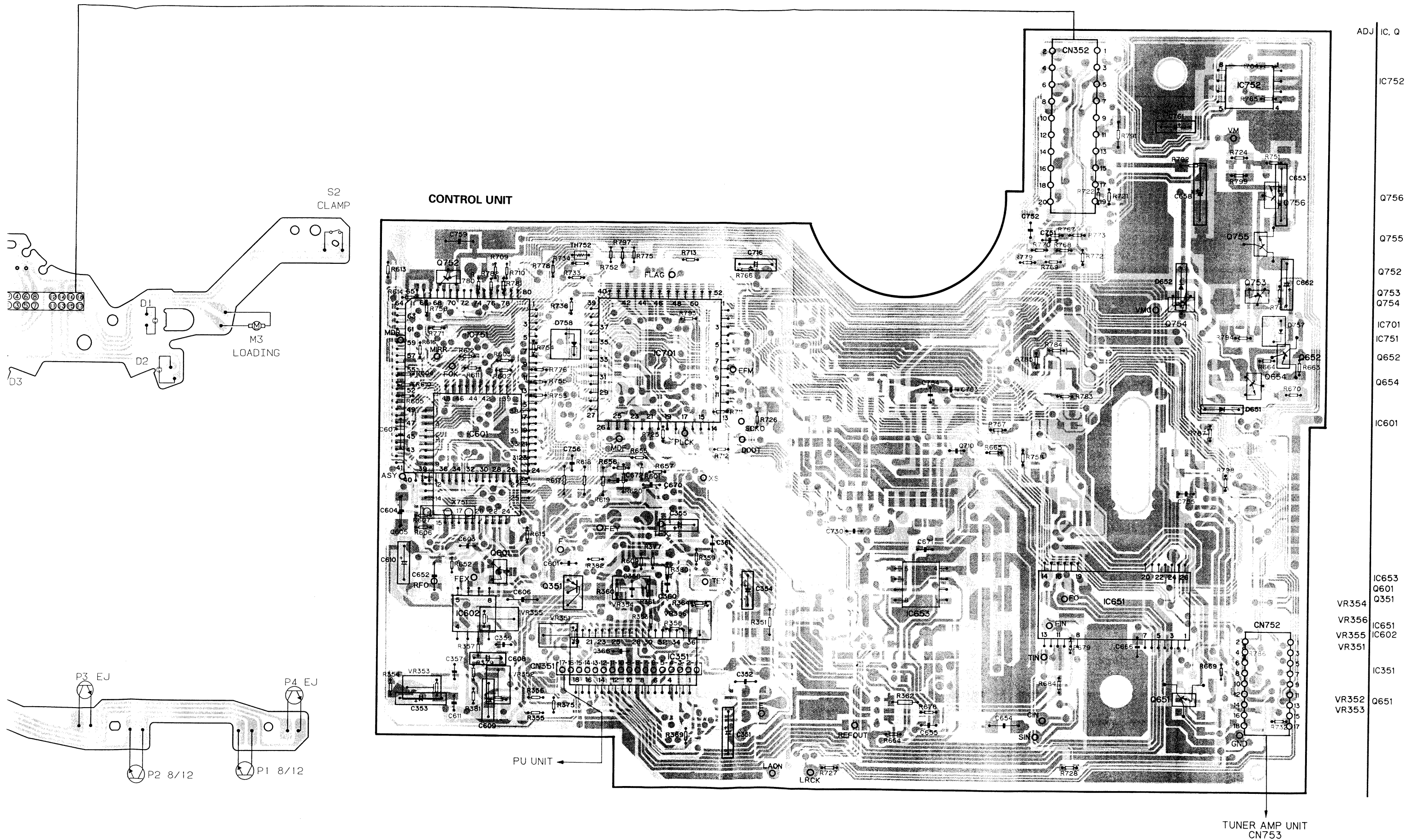
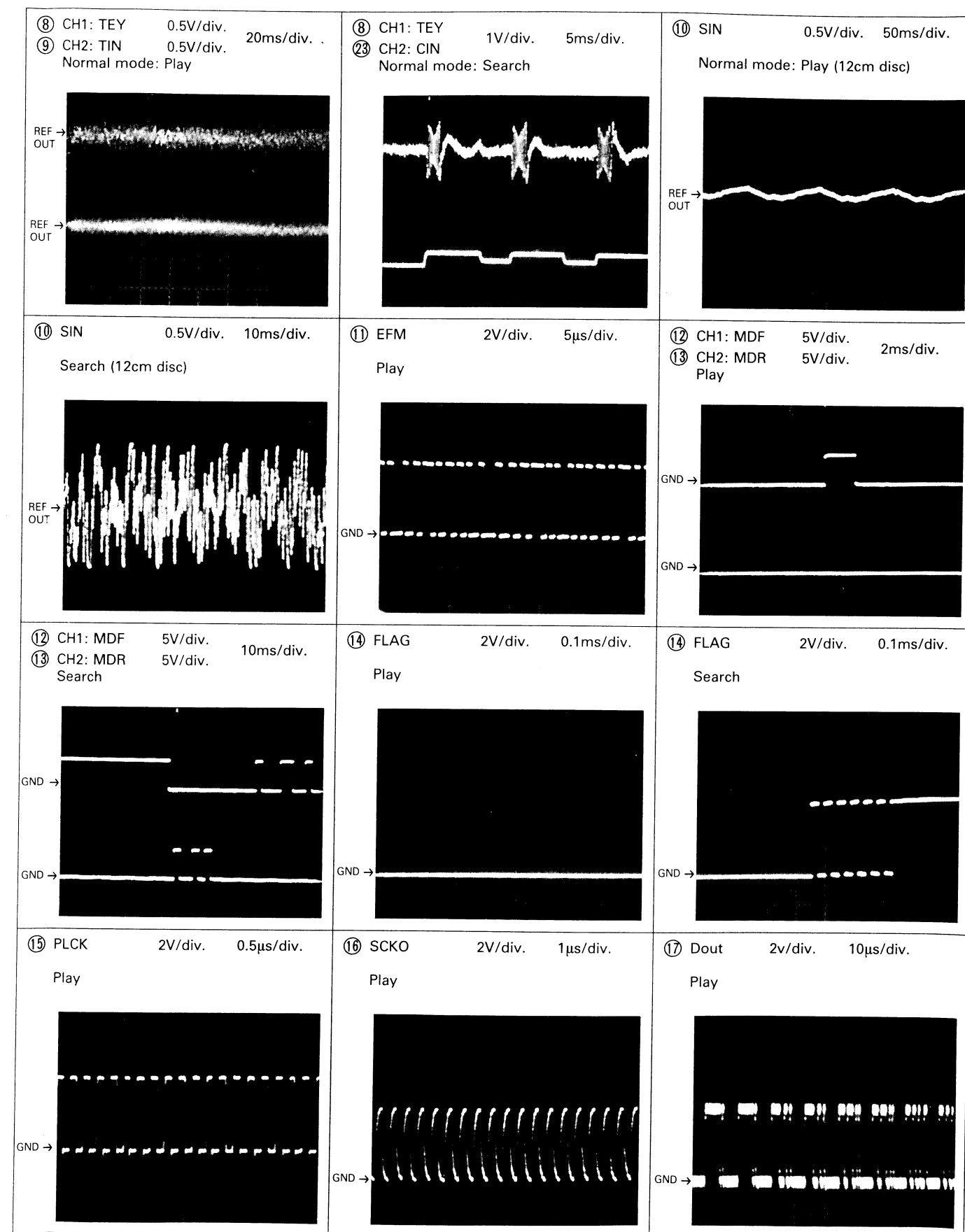
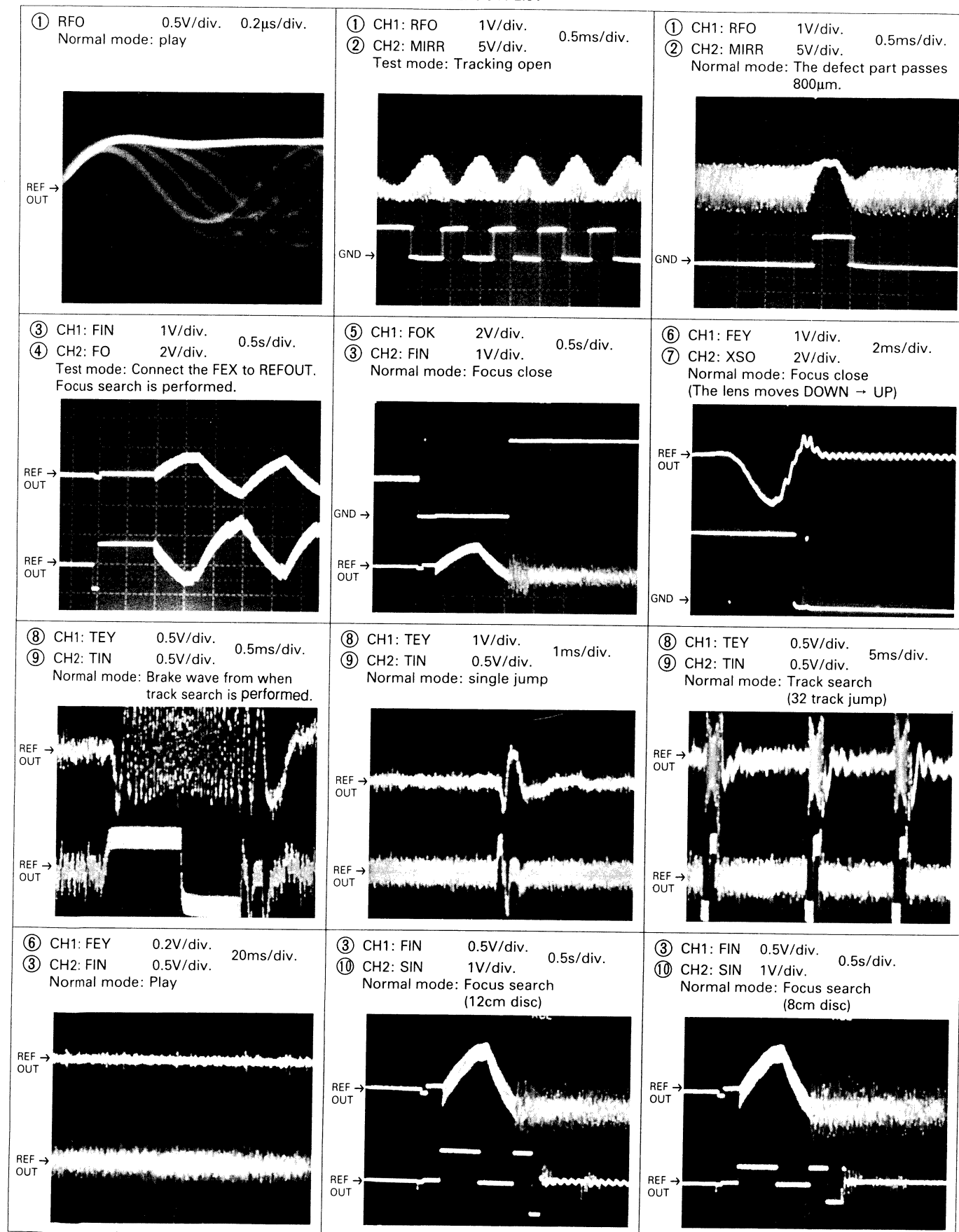


Fig. 47

● Wave Forms

Note: 1. The encircled numbers denote measuring points in the circuit diagram.
2. Reference voltage
REFOUT: 2.5V

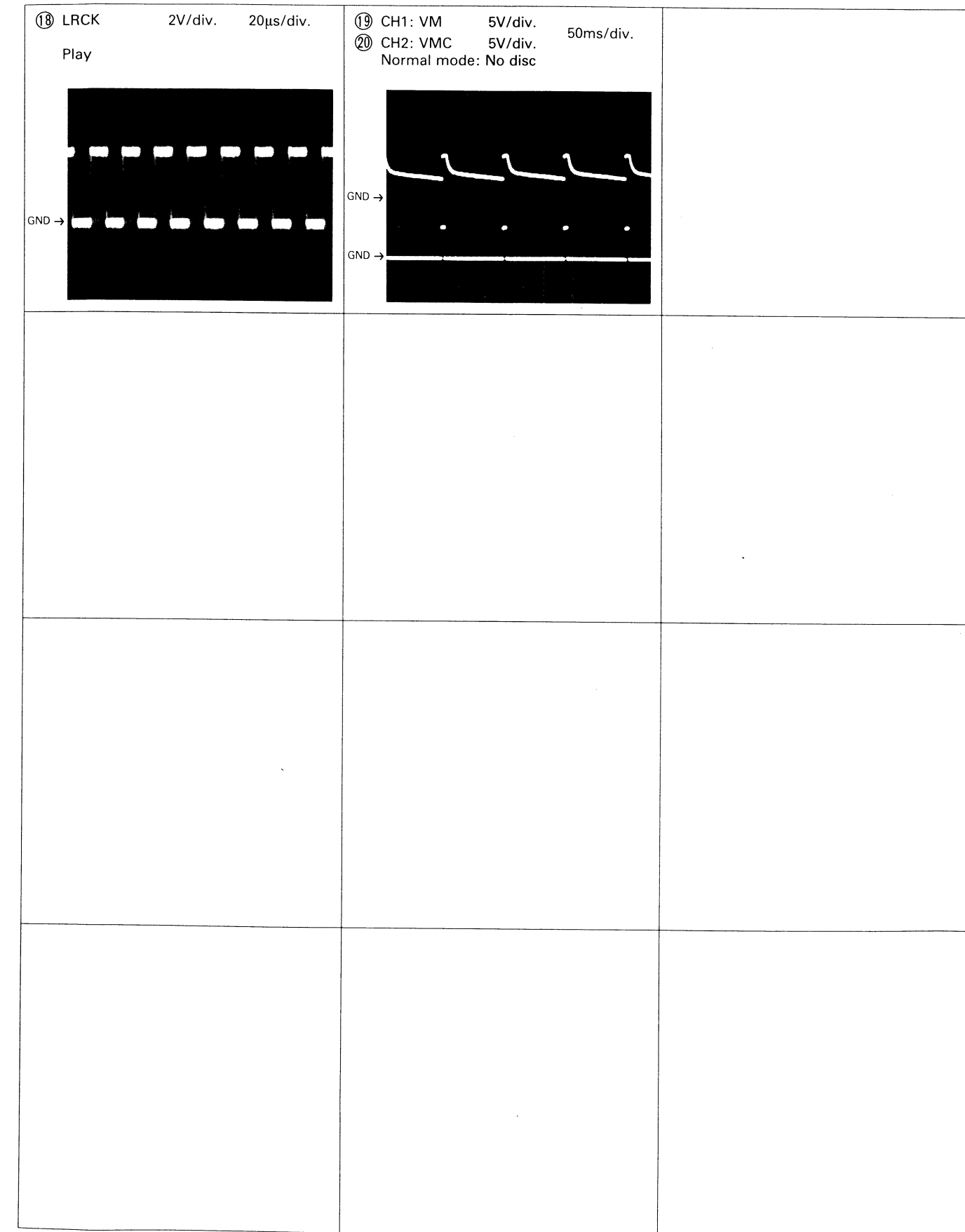
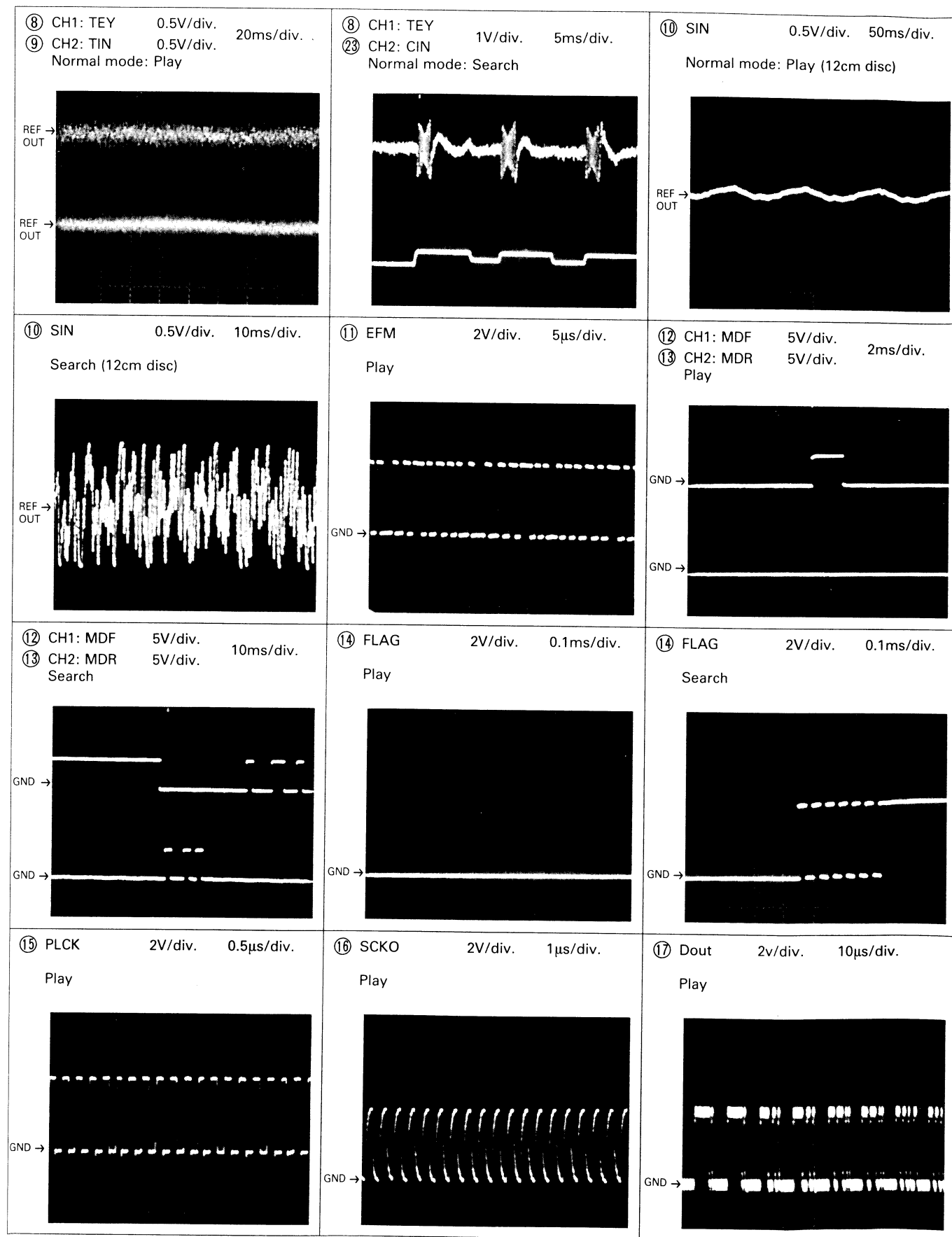


ram.

s/div.
asses

div.

div.



8.2 KEY BOARD UNIT

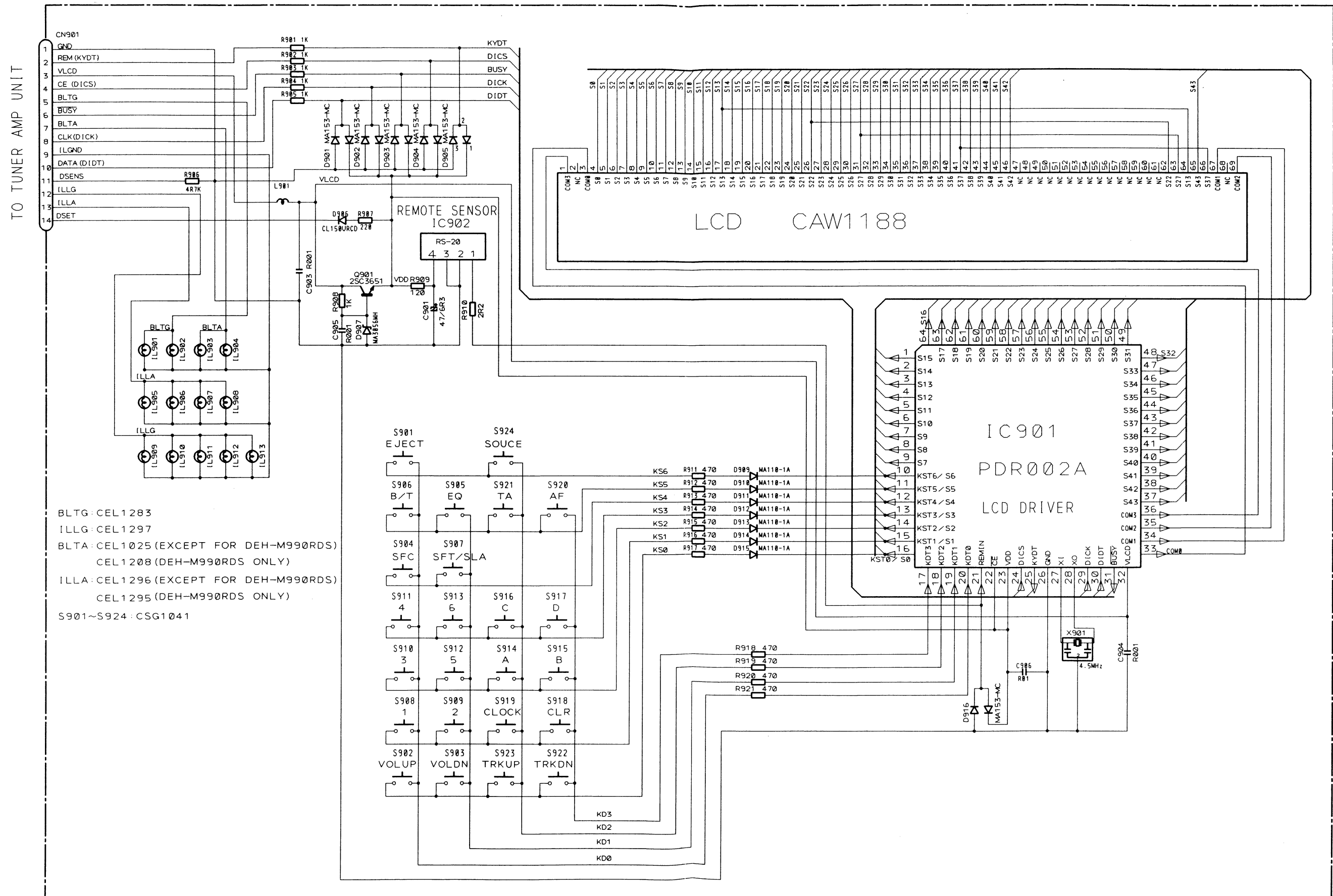
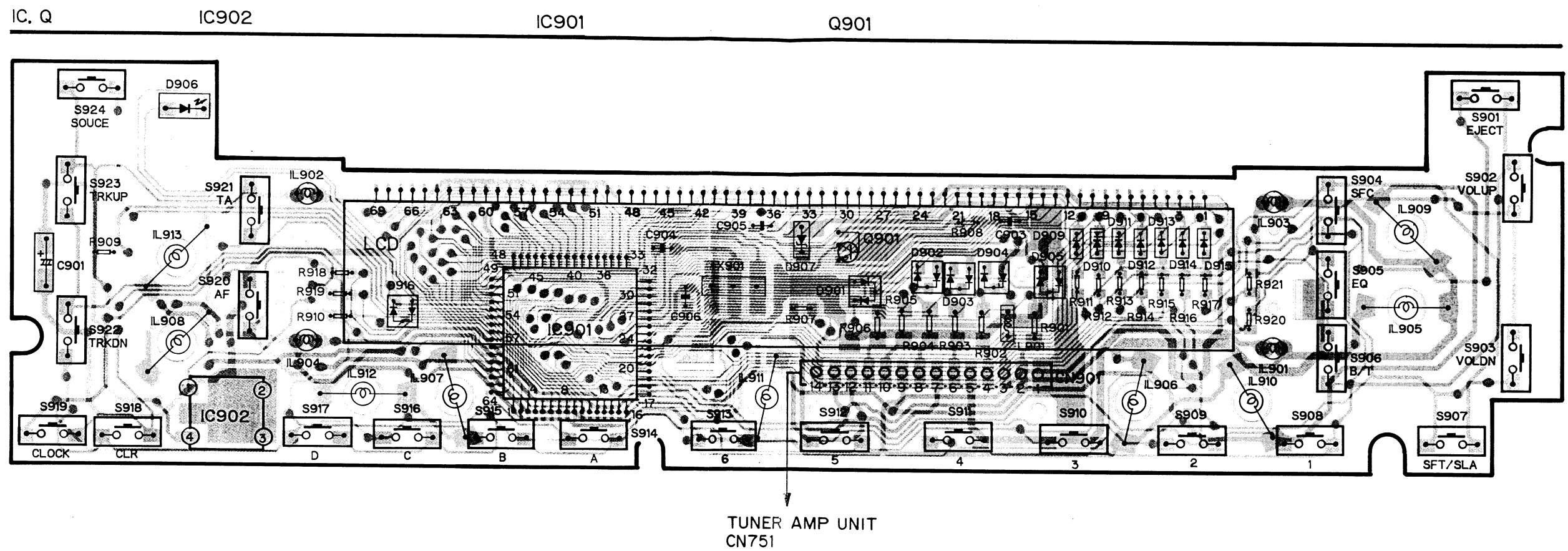


fig. 48



TUNER AMP UNIT
CN751

Fig. 49

Fig. 48

8.3 FM/AM UNIT (DEH-M990RDS)

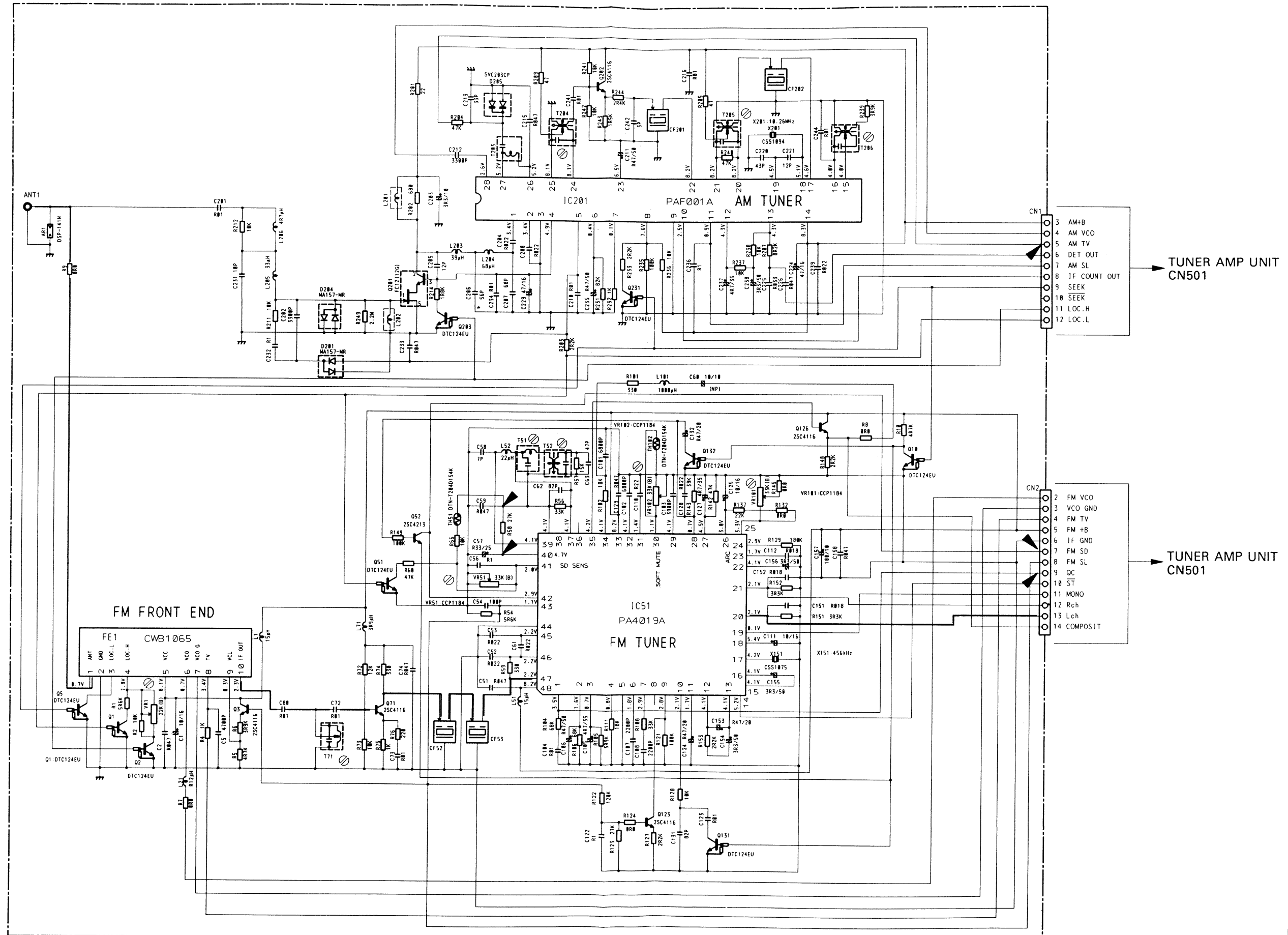


Fig. 50

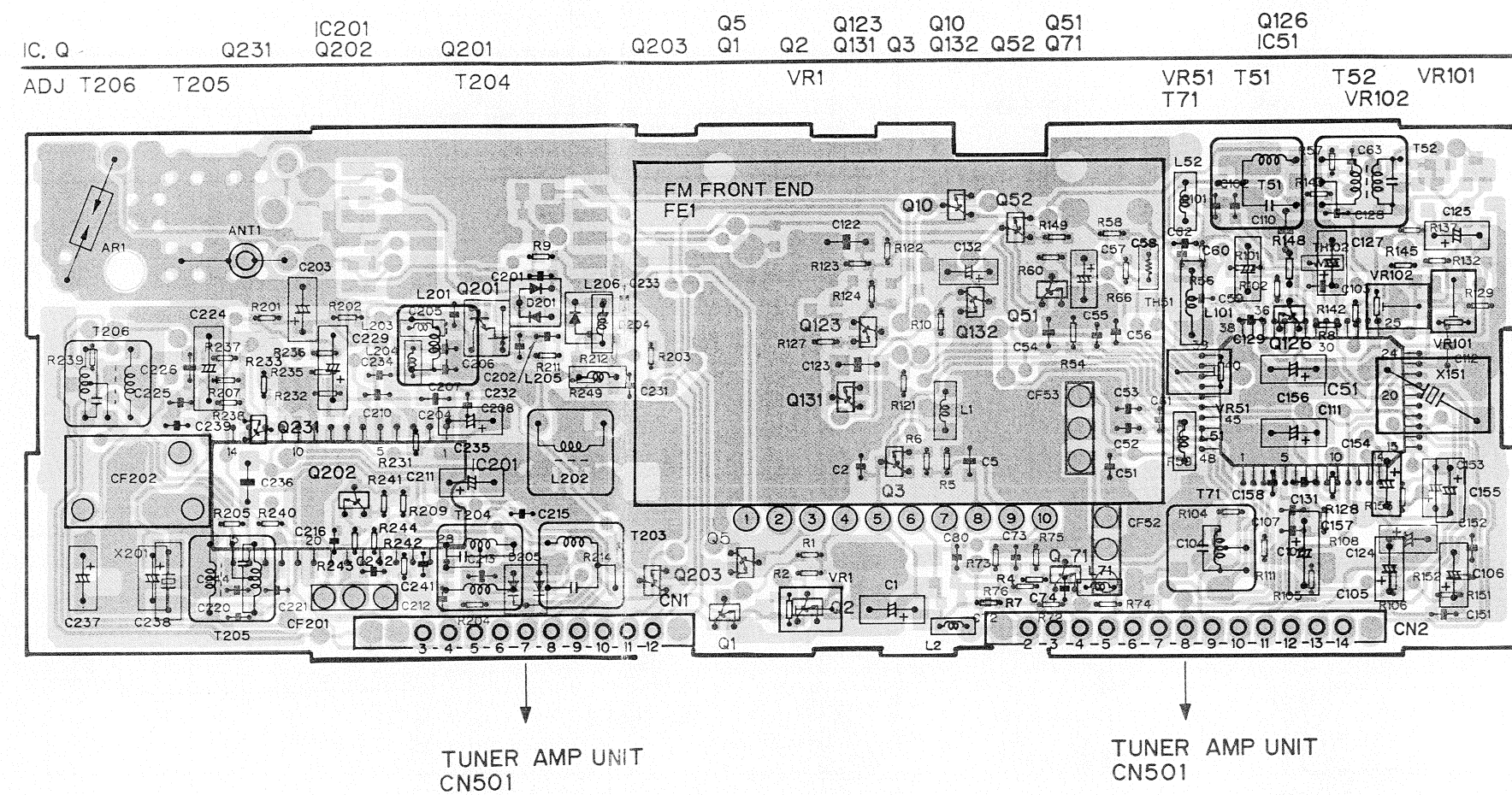


Fig. 51

8.4 FM/AM UNIT (DEH-M990DSP, DEH-M970DSP)

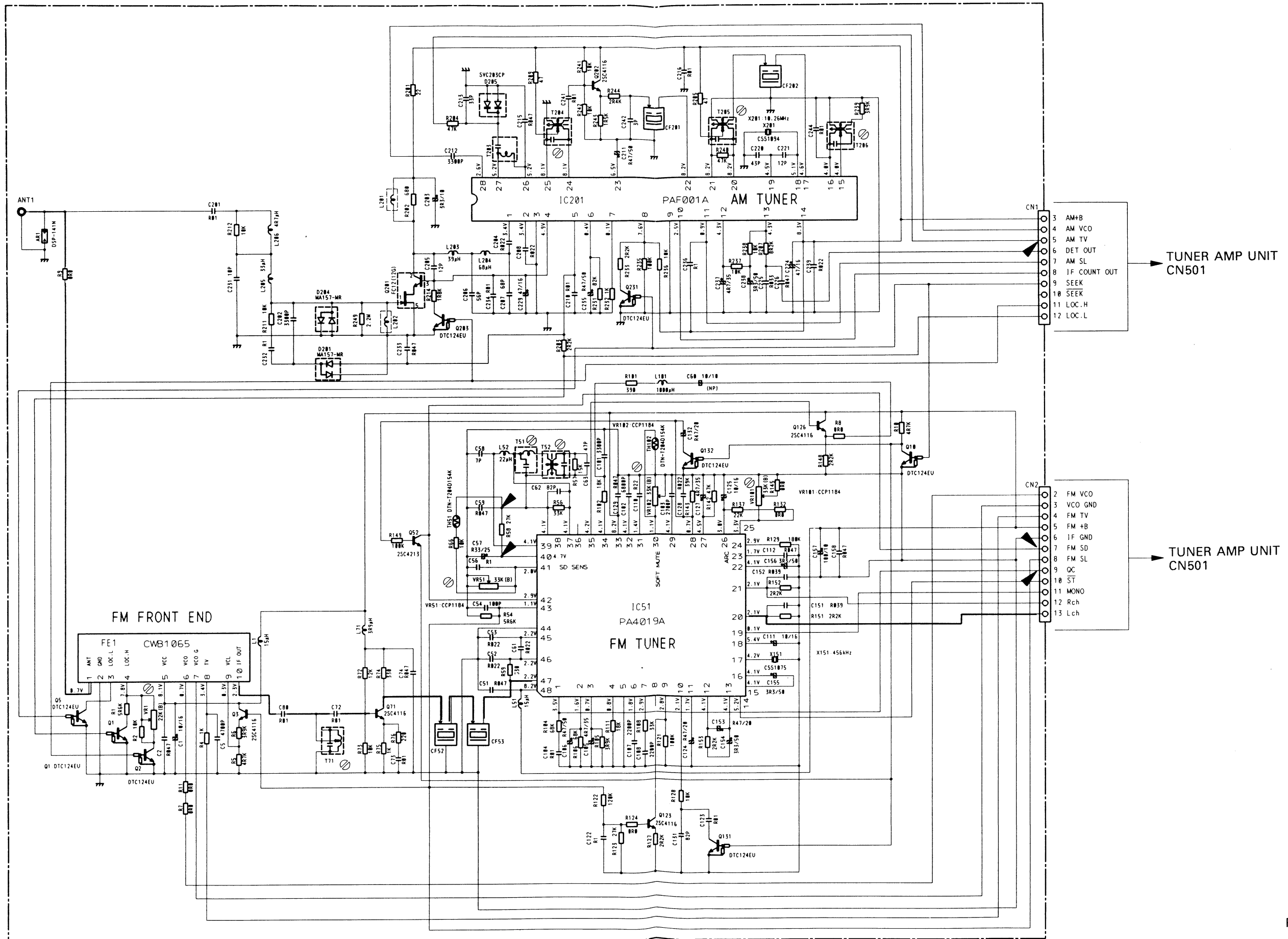


Fig. 52

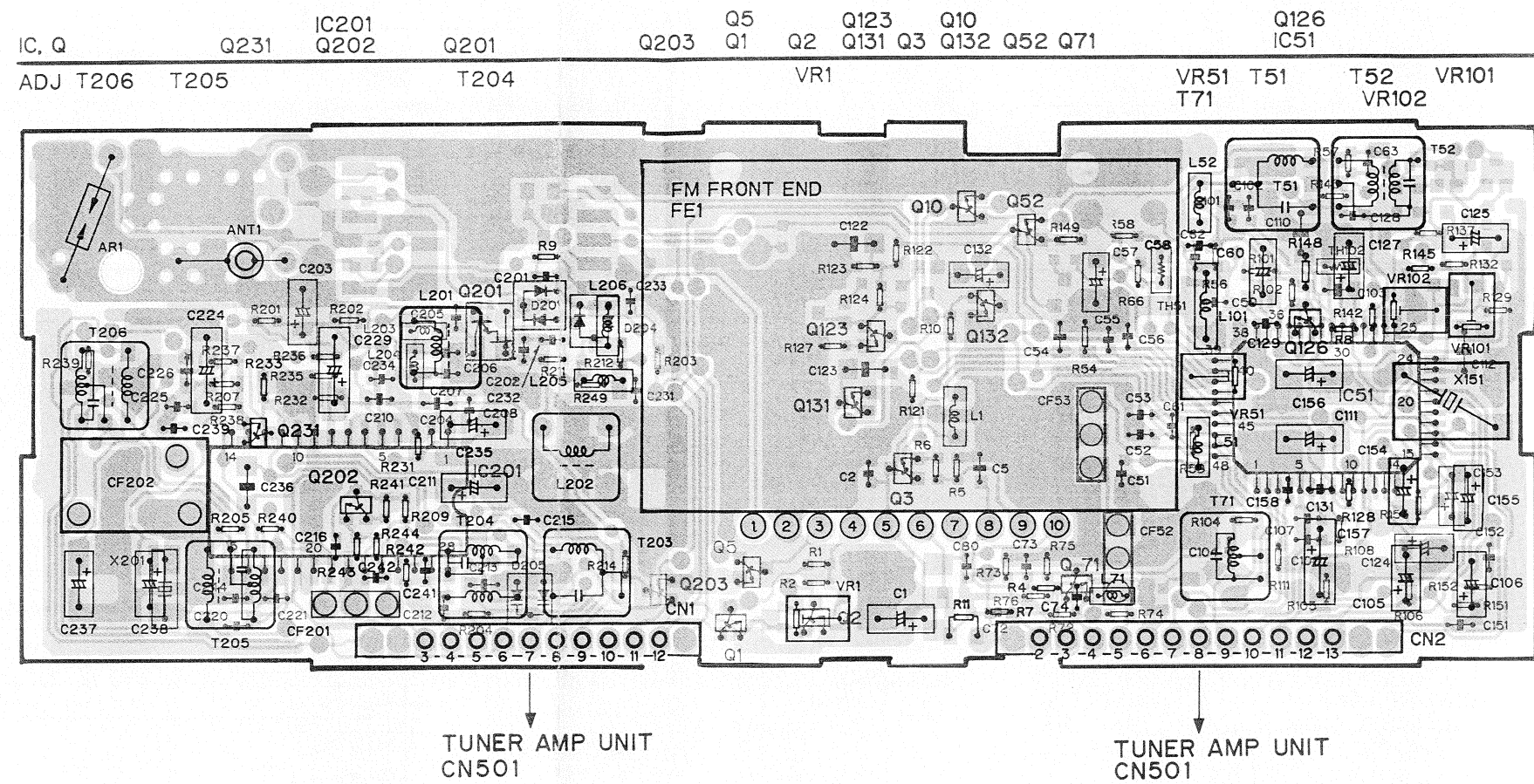
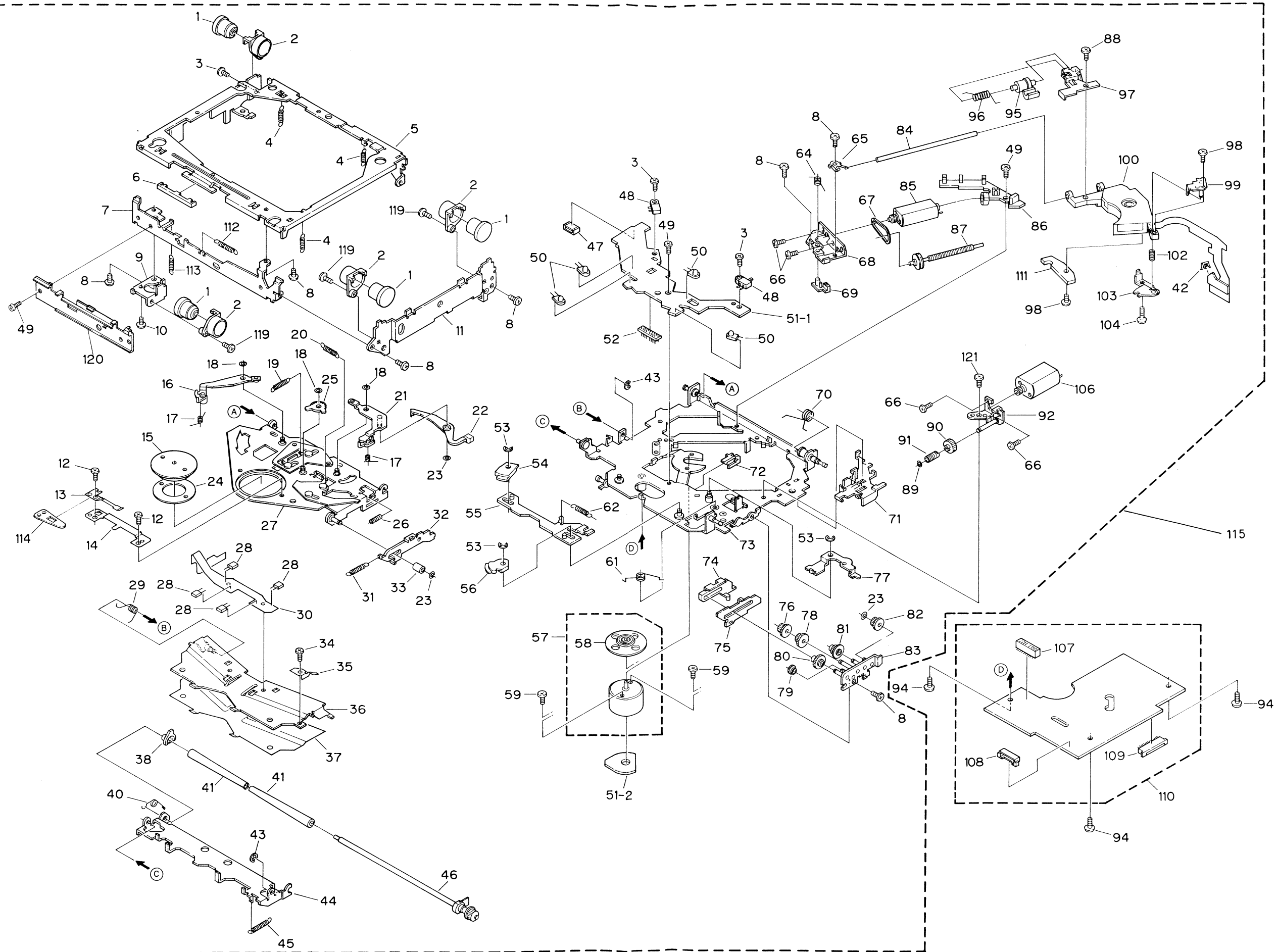


Fig. 53

9. CD MECHANISM MODULE EXPLODED VIEW



NOTES:
 ● Parts marked with this symbol are not included in the kit and must be purchased separately.
 ● Parts marked with this symbol are not included in the kit and must be purchased separately.

Mark	No
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
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21	21
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26	26
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32	32
33	33
34	34
35	35
36	36
37	37
38	38
39	39
40	40
41	41
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43	43
44	44
45	45

Fig. 54

NOTES:

- Parts marked by " * " are generally unavailable because they are not in our Master Spare Parts List.
- Parts marked by " ⊙ " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

A ● Parts List

Mark	No.	Description	Part No.	Mark	No.	Description	Part No.	Mark	No.	Description	Part No.	Mark	No.	Description	Part No.
	1	Damper	CNV2882		46	Gear Unit	CXA5385		91	Gear	CNV2868	⊙	106	Motor Unit>Loading)	CXA4267
	2	Holder	CNV2863		47	Connector(4P)	CKS2088		92	Bracket Unit	CXA5078	*	107	Connector(CN352)	CKS2063
	3	Screw	CBA1004		48	Switch(S1,2)	CSN1012		93	.....			108	Connector(CN752)	CKS2149
	4	Spring	CBH1417		49	Screw	CBA1077		94	Screw	PMS26P040FMC	*	109	Connector(CN351)	CKS2121
	5	Frame	CNC3816		50	LED(D1-4)	BR4361F		95	Rack	CNV3268		110	Control Unit	CWX1547
	6	Guide	CNV2891		51	Composite P.C.Board	CNX1956		96	Spring	CBH1580		111	Weight	CNC4551
	7	Frame	CNC4783		52	Connector(16P)	CKS2064		97	Bracket	CNC4436		112	Spring	CBH1458
	8	Screw	BMZ20P030FMC		53	Washer	YE20FUC		98	Screw	JFZ17P035FNI		113	Spring	CBH1457
	9	Bracket	CNC4687		54	Arm	CNV2884		99	Holder Unit	CXA5246		114	Spacer	CNM3315
	10	Screw	BMZ20P040FNI		55	Lever Unit	CXA5093		100	PU Unit	CGY1020	⊙	115	CD Mechanism Unit	CXA4260
	11	Frame	CNC4686		56	Arm	CNV2885		101	.....		116-118	.....	
	12	Screw	JFZ20P018FNI		57	Motor(Spindle)	CXM1058		102	Spring	CBH1422		119	Screw	CBA1230
	13	Spring	CBL1131		58	Support Wheel	CNV2859		103	Holder	CNC4306		120	Guide	CNV3462
B	14	Bracket	CNC3830		59	Screw	HBA-258		104	Screw	JGZ20P070FNI		121	Screw	PMS20P025FMC
	15	Clamper	CNV2864		60	.....			105	.....				
	16	Arm Unit	CXA5090		61	Spring	CBH1414								
	17	Spring	CBH1415		62	Spring	CBH1424								
	18	Washer	CBF1039		63	.....								
	19	Spring	CBH1418		64	Spring	CBH1410								
	20	Spring	CBH1419		65	Spring	CBL1129								
	21	Arm Unit	CXA5091		66	Screw	JFZ20P025FMC								
	22	Arm	CNV2876		67	Belt	CNT1047								
	23	Washer	CBF1038		68	Bracket	CNC3832								
	24	Sheet	CNM3582		69	Holder	CNV2878								
	25	Gear	CNV2875		70	Spring	CBH1413								
	26	Spring	CBH1423		71	Cover	CNV2889								
	27	Arm Unit	CXA5383		72	Holder	CNV3023								
	28	Photo-transistor	PT4800		73	Chassis Unit	CXA4258								
	29	Spring	CBH1449		74	Lever	CNV2874								
C	30	P.C.Board	CNP3330		75	Lever	CNC3824								
	31	Spring	CBH1420		76	Gear	CNV2871								
	32	Lever	CNC3828		77	Arm	CNC3833								
	33	Roller	CLA1936		78	Gear	CNV2872								
	34	Screw	JFZ20P018FNI		79	Gear	CNV2883								
	35	Spring	CBL1130		80	Gear	CNV2873								
	36	Arm Unit	CXA4263		81	Gear	CNV2870								
	37	Sheet	CNM3111		82	Gear	CNV2869								
	38	Holder	CNV3276		83	Bracket Unit	CXA4261								
	39	.....			84	Shaft	CLA2027								
	40	Spring	CBH1509		85	Motor Unit(Carriage)	CXA4649								
	41	Roller	CNV3412		86	Holder	CNV2888								
	42	Short Pin	CBL1010		87	Screw Unit	CXA5384								
	43	Washer	YE15FUC		88	Screw	CBA1082								
	44	Arm	CNC3819		89	Washer	CBF1054								
D	45	Spring	CBH1510		90	Gear	CNV2892								

10. CHASSIS EXPLODED VIEW

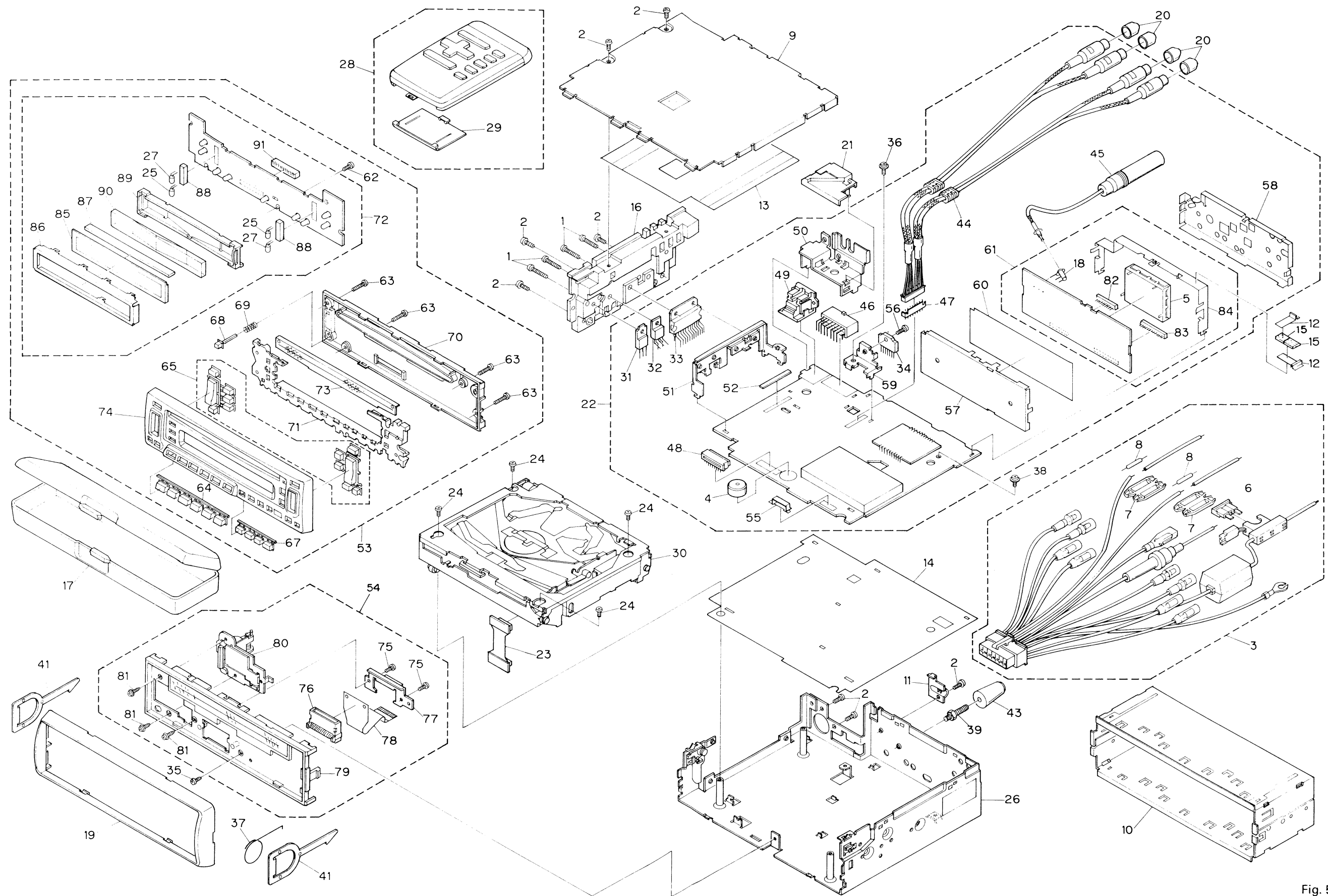


Fig. 55

● Par

Mark

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● Parts List(DEH-M990RDS)

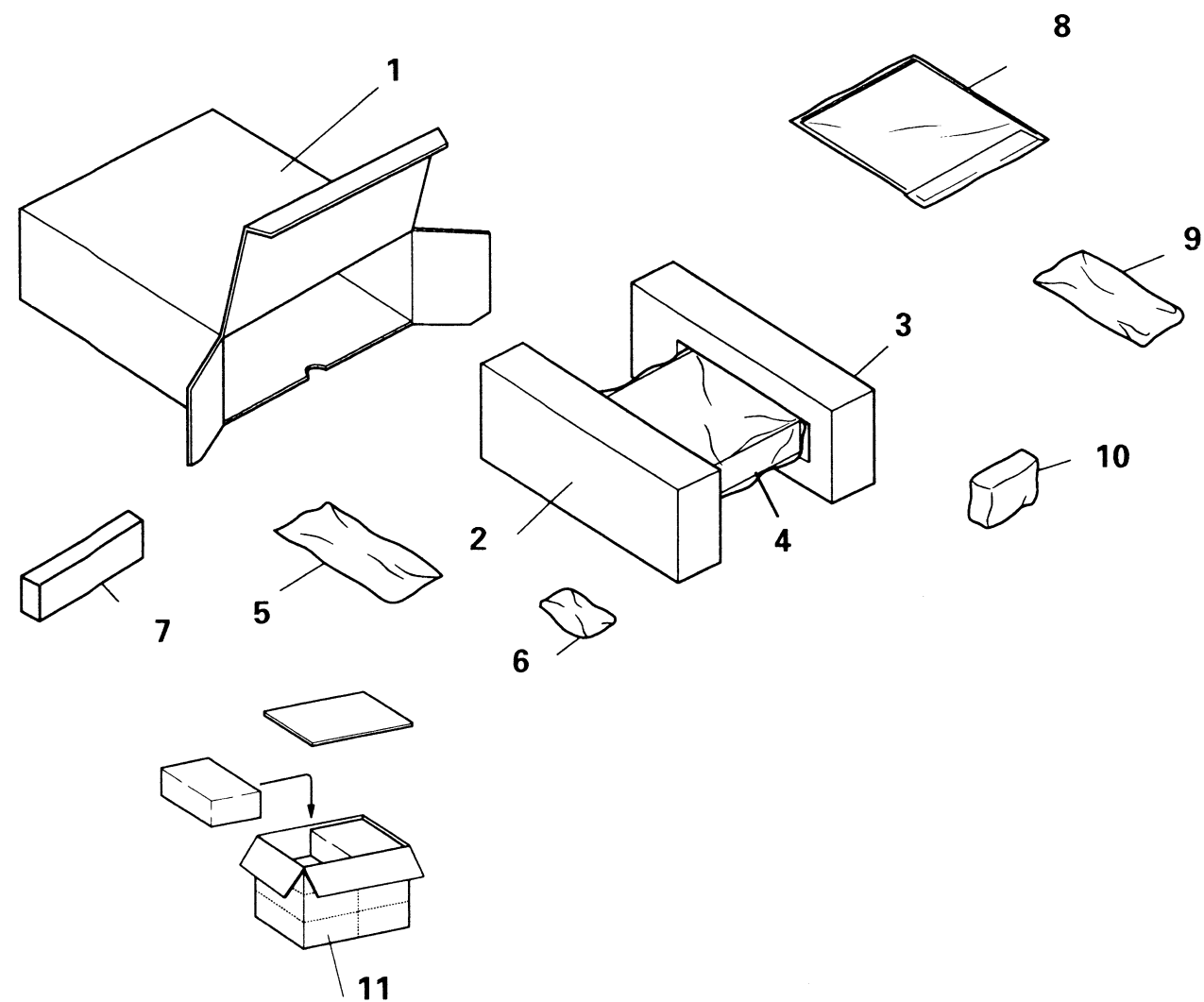
Mark No.	Description	Part No.	Mark No.	Description	Part No.
A	1 Screw	BMZ26P140FMC	46	Connector(CN951)	CKM1091
	2 Screw	BMZ30P050FMC	* 47	Plug(CN851)(8P)	CKS1228
	3 Cord Assy	CDE3982	48	Connector(CN751)(14P)	CKS1534
	4 Buzzer(BZ751)	CPV1010	49	Connector(CN752)(13P)	CKS2105
	5 FM Front End	CWB1065	* 50	Bracket	CNC4341
	6 Fuse(10A)	CEK1136	* 51	Bracket	CNC4388
	7 Cap	CNS1472	52	Spacer	CNM3343
	8 Resistor	RS1/2P102JL	53	Detach Grille Assy	CXA5104
	* 9 Case	CNB1638	54	Panel Assy	CXA5109
	10 Holder	CNC1484	55	Connector(CN753)(18P)	CKS2149
	* 11 Holder	CNC3850	56	Screw	BMZ26P060FMC
	* 12 Earth Plate	CNC4147	* 57	Case	CNB1414
	* 13 Insulator	CNM3193	* 58	Case	CNB1658
	* 14 Insulator	CNM3459	* 59	Holder	CNC4389
	15 Cushion	CNM3637	* 60	Insulator	CNM2891
B	* 16 Heat Sink	CNR1291	61	FM/AM Unit	CWE1278
	17 Case	CNS2269	62	Screw	BPZ20P080FMC
	* 18 Antenna Jack(ANT1)	CKX1010	63	Screw	BPZ20P100FZK
	19 Panel	CNS2498	64	Button	CAC3052
	20 Cap	CNV2680	65	Button	CXA5407
	21 Holder	CNV2893	66	.....
	22 Tuner Amp Unit	CWX1518	67	Button	CAC3325
	23 Connector Unit	CXA4720	68	Button	CAC3327
	24 Screw	BMZ26P040FMC	69	Spring	CBH1407
	25 Lamp(IL901,902)(Green)	CEL1283	70	Cover	CNS2514
	* 26 Chassis Unit	CXA4981	71	Lens	CNV3258
	27 Lamp(IL903,904)(Orange)	CEL1208	72	Key Board Unit	CWX1521
	28 Remote Control Assy	CXA5201	73	Cover Unit	CXA4483
	29 Battery Cover	CNS2432	74	Grille Unit	CXA4978
	30 CD Mechaniam Module	CXK2530	75	Screw	CBA1202
C	31 Transistor(Q978)	2SD1944	76	Socket(14P)	CKS2494
	32 IC(IC951)	L780S05	* 77	Holder	CNC4701
	33 IC(IC551)	PA3027A	78	P.C.Board	CNP3372
	34 IC(IC952)	TA8214K	79	Panel Unit	CXA4977
	35 Screw	PMS20P060FZK	80	Eject Mechanism Assy	CXA5110
	36 Screw	PMS30P050FMC	81	Screw	PMS20P040FZK
	37 Spring	CBH-865	* 82	Plug(CN1)	CKS1607
	38 Screw	PMB30P060FMC	* 83	Plug(CN2)(13P)	CKS1621
	39 Screw	CBA1002	* 84	Holder	CNC3506
	40		85	LCD	CAW1188
	41 Handle	CNC1631	* 86	Holder	CNC4390
	42		87	Connector	CNV2751
	43 Bush	CNV1917	88	Holder	CNV2752
	44 Cord	CDE3270	89	Holder	CNV3256
	45 Antenna Cable	CDH1129	90	Lens	CNV3257
D			* 91	Plug(CN901)(14P)	CKS2402

●The DEH-M990DSP and DEH-M970DSP Parts Lists enumerate the parts which differ from those enumerated in the DEH-M990RDS Parts List only. The parts other than those enumerated in the former are identical with those in the latter, to which you are requested to refer,accordingly. The DEH-M990RDS Parts List is given on page 83.

Mark No.	Description	DEH-M990RDS	DEH-M990DSP	DEH-M970DSP
		Part No.	Part No.	Part No.
3	Cord Assy	CDE3982	CDE3983	CDE3983
22	Tuner Amp Unit	CWX1518	CWX1520	CWX1519
25	Lamp	CEL1208	CEL1025	CEL1025
* 26	Chassis Unit	CXA4981	CXA4982	CXA4982
28	Remote Control Assy	CXA5201	CXA5202	CXA5201
44	Cord	CDE3270	CDE3546	CDE3546
53	Detach Grille Assy	CXA5104	CXA5108	CXA5206
61	FM/AM Unit	CWE1278	CWE1280	CWE1278
65	Button	CXA5407	CXA5408	CXA5408
72	Key Board Unit	CWX1521	CWX1522	CWX1522
74	Grille Unit	CXA4978	CXA4979	CXA4980

Fig. 55

11. PACKING METHOD



●Parts List(DEH-M990RDS)

Mark	No.	Description	Part No.	Mark	No.	Description	Part No.
	1	Carton	CHG2275		6	Accessory Assy	CEA1473
	2	Styrofoam	CHP1521	*	6-1	Polyethylene Bag	CEG-127
	3	Styrofoam	CHP1522	*	6-2	Battery	CEX1006
	4	Cover	CEG1092		6-3	Fastener	CNM3629
	5	Accessory Assy	CEA1778		6-4	Fastener	CNM3630
	5-1	Spring	CBH-865		7	Cord	CDE3982
*	5-2	Screw Assy	CEA1808		8-1	Owner's Manual	CRD1620
	5-2-1	Screw	CBA-102		8-2	Owner's Manual	CRD1621
	5-2-2	Screw	CBA1002		8-3	Caution Card	CRD1622
*	5-2-3	Polyethylene Bag	CEG-127	*	8-4	Card	CRY-062
*	5-2-4	Nut(x2)	NF50FMC	*	8-5	Passport	CRY1013
*	5-3	Polyethylene Bag	CEG-158	*	8-6	Polyethylene Bag	CEG1116
	5-4	Handle(x2)	CNC4846		9	Case	CNS2269
	5-5	Strap	CNF-111		10	Remote Control Assy	CXA5201
	5-6	Bush	CNV1917		11	.....

●The DEH-M990DSP and DEH-M970DSP Parts Lists enumerate the parts which differ from those enumerated in the DEH-M990RDS Parts List only. The parts other than those enumerated in the former are identical with those in the latter, to which you are requested to refer, accordingly. The DEH-M990RDS Parts List is given on page 86.

Mark No. Description	DEH-M990RDS	DEH-M990DSP	DEH-M970DSP
	Part No.	Part No.	Part No.
1 Carton	CHG2275	CHG2276	CHG2277
5 Accessory Assy	CEA1778	CEA1774	CEA1774
5-2 Screw Assy	CEA1808	CEA1761	CEA1761
5-2-5 Screw(x4)	.....	CMZ50P080FMC	CMZ50P080FMC
5-2-6 Screw(x4)	.....	BMZ50P080FMC	BMZ50P080FMC
7 Cord	CDE3982	CDE3983	CDE3983
8-1 Owner's Manual	CRD1620	CRD1618	CRD1619
8-2 Owner's Manual	CRD1621	.....	.....
* 8-3 Caution Card	CRD1622	.....	.....
* 8-4 Card	CRY-062	ARY1048	.....
* 8-5 Passport	CRY1013	.....	.....
* 8-6 Polyethylene Bag	CEG1116	.....	.....
10 Remote Control Assy	CXA5201	CXA5202	CXA5201

Fig. 56

Owner's Manual	
Part No.	Language
CRD1618	English,French
CRD1619	English,French,Spanish,Arabic
CRD1620	English,French,German,Italian,Dutch
CRD1621	Swedish,Norwegian,Finnish,Spanish,Dutch

12. ELEC

NOTE:
● Parts whose p
● The part num
Chip Resistor
RS1/OSC
Chip Capacit
CKS....., CC
====Circuit Symb
Unit Number :
Unit Name : FM
MISCELLANEOUS
IC 51
IC 201
Q 1 5
Q 2 10 51
Q 3 71 123
Q 52
Q 126
Q 201
Q 202
Q 203
Q 231
D 201 204
D 205
L 1
L 2
L 51
L 52
L 71
L 101
L 101
L 201
L 202
L 203
L 204
L 205
L 206
T 51
T 52
T 71
T 203
T 204
T 205
T 206
TH 51 102
CF 52 53
CF 201
CF 202
X 151
X 201
VR 1
VR 51 101 102
AR 1
FE 1
RESISTORS
R 1
R 2 66 73
R 4
R 5
R 6

12. ELECTRICAL PARTS LIST

NOTE:
● Parts whose parts numbers are omitted are subject to being not supplied.
● The part numbers shown below indicate chip components.
Chip Resistor
RS1/OSOOOJ,RS1/OOSOOOJ
Chip Capacitor (except for CQS.....)
CKS....., CCS....., CSZS.....

====Circuit Symbol & No. Part Name=====	Part No.	====Circuit Symbol & No. Part Name=====	Part No.
Unit Number : Unit Name : FM/AM Unit(DEH-M990RDS)			
MISCELLANEOUS			
IC 51 IC 201 Q 1 5 Q 2 10 51 131 132 Q 3 71 123 Q 52 Q 126 Q 201 Q 202 Q 203 Q 231 D 201 204 L 205 L 1 L 2 L 51 L 52 L 71 L 101 L 201 L 202 L 203 L 204 L 205 L 206 T 51 T 52 T 71 T 203 T 204 T 205 T 206 TH 51 102 CF 52 53 CF 201 CF 202 X 151 X 201 VR 1 VR 51 101 102 AR 1 FE 1 RESISTORS R 1 R 2 66 73 R 4 R 5 R 6	PA4019A PAF001A DTC124EU DTC124EU 2SC4116 2SC4213 2SC4116 FC12(12G) 2SC4116 DTC124EU DTC124EU MA157-MR SVC203CP LCTA150K3225 LCTBR12K2125 LCTA150K3225 LCTA220K3225 LCTB3R9K2125 LCTA102K4532 CTB1086 CTB1082 LCTB390K2125 LCTB680K2125 CTF1198 CTF1197 CTE1067 CTE1068 CTE1058 CTB1087 CTE1064 CTE1060 CTE1061 DTNT204D154K CTF1193 CTF1262 CTF1191 CSS1075 CSS1094 CCP1183 CCP1184 DSP-141N CWB1065 RS1/16S562J RS1/16S103J RS1/16S102J RS1/16S472J RS1/16S392J	R 7 8 9 R 10 R 54 R 56 R 57 R 58 R 59 74 R 60 R 72 R 75 R 76 R 101 R 102 111 R 104 106 R 105 R 108 R 121 149 R 122 R 123 R 124 132 R 127 153 R 128 R 129 R 137 R 142 R 143 R 145 R 148 R 151 152 R 201 R 202 R 203 R 204 R 205 209 R 207 R 211 212 236 237 238 R 214 R 231 R 232 R 233 R 235 R 239 R 240 R 241 242 R 243 R 244 R 249	RS1/16S0R0J RS1/16S472J RS1/10S562J RS1/16S333J RS1/16S153J RS1/16S273J RS1/16S331J RS1/16S473J RS1/16S123J RS1/16S102J RS1/16S221J RS1/10S331J RS1/16S183J RS1/16S683J RS1/16S333J RS1/16S333J RS1/16S104J RS1/16S124J RS1/16S273J RS1/16S0R0J RS1/16S222J RS1/16S103J RS1/16S184J RS1/16S223J RS1/16S473J RS1/16S393J RS1/16S0R0J RS1/10S222J RS1/16S332J RS1/16S220J RS1/10S681J RS1/16S222J RS1/16S473J RS1/16S470J RS1/10S822J RS1/16S103J RS1/16S182J RS1/16S823J RS1/10S102J RS1/16S222J RS1/16S104J RS1/16S392J RS1/16S473J RS1/16S103J RS1/16S152J RS1/16S242J RS1/16S225J

====Circuit Symbol & No. Part Name=====	Part No.	====Circuit Symbol & No. Part Name=====	Part No.
CAPACITORS C 1 111 125 C 2 51 59 C 5 C 52 53 61 C 54 C 56 C 57 C 58 C 60 C 62 C 63 C 72 73 80 104 C 74 129 158 C 101 102 C 103 C 105 C 106 C 107 108 C 110 C 112 C 122 C 123 C 124 132 153 C 127 C 128 C 131 C 151 152 C 154 155 156 C 157 C 201 216 241 C 202 212 C 203 C 204 C 205 221 C 206 C 207 C 208 C 210 C 211 235 C 213 C 215 C 220 C 224 229 C 225 C 226 C 231 C 232 234 244 C 233 C 236 C 237 C 238 C 239 C 242 UnitNumber : UnitName :FM/AM Unit(DEH-M990DSP,DEH-M970DSP) MISCELLANEOUS IC 51 IC 201 Q 1 5 Q 2 10 131 132 203 Q 3 71 123	CEV100M16 CKSRYF473Z25 CKSQYB472K50 CKSRYB223K25 CCSQCH101J50 CKSRYF104Z25 CSZSR33M25 CCSRCH070D50 CEVNP100M10 CCSRPH820J50 CCSRPH470J50 CKSRYB103K50 CKSRYF473Z25 CKSRYB682K50 CKSQYB392K50 CEV2R2M50 CEVR47M50 CKSRYB222K50 CKSYB224K25 CKSYB183K50 CKSYB104K50 CKSYB103K50 CSZSR47M20 CEV4R7M35 CKSRYB223K25 CCSRCH820J50 CKSQYB183K25 CEV3R3M50 CEV101M10 CKSRYB103K50 CKSRYB332K50 CSZS3R3M10 CKSQYB223K25 CCSRCH120J50 CCSRCH560J50 CCSRCH680J50 CKSRYB223K25 CKSQYB103K50 CEVR47M50 CCSQCH330J50 CKSRYF473Z25 CCSRCH430J50 CEV470M16 CKSQYB333K25 CKSQYB473K25 CCSRCH100D50 CKSRYB103K50 CKSRYF473Z25 CKSYB104K50 CEV4R7M35 CEV3R3M50 CKSRYB223K25 CCSRCH030C50 PA4019A PAF001A DTC124EU DTC124EU 2SC4116	Q 52 Q 126 Q 201 Q 202 Q 231 D 201 204 D 205 L 1 L 51 L 52 L 71 L 101 L 201 L 202 L 203 L 204 L 205 L 206 T 51 T 52 T 71 T 203 T 204 TH 51 102 CF 52 53 CF 201 CF 202 X 151 X 201 VR 1 VR 51 101 102 AR 1 FE 1 RESISTORS R 1 R 2 66 73 R 4 R 5 R 6 R 7 8 9 R 10 R 11 R 54 R 56 R 57 R 58 R 59 74 R 72 R 75 R 76 R 101 R 102 111 R 104 106 R 105 R 108 R 121 149 R 122 R 123 R 124 132	2SC4213 2SC4116 FC12(12G) 2SC4116 DTC124EU MA157-MR SVC203CP LCTA150K3225 LCTA150K3225 LCTA220K3225 LCTB3R9K2125 LCTA102K4532 CTB1086 CTB1082 LCTB390K2125 LCTB680K2125 CTF1198 CTF1197 CTE1067 CTE1068 CTE1058 CTB1087 CTE1064 CTE1060 CTE1061 DTN-T204D154K CTF1247 CTF1262 CTF1191 CSS1075 CSS1094 CCP1183 CCP1184 DSP-141N CWB1065 RS1/16S562J RS1/16S103J RS1/16S102J RS1/16S472J RS1/16S392J RS1/16S0R0J RS1/16S472J RS1/10S0R0J RS1/10S562J RS1/16S333J RS1/16S153J RS1/16S273J RS1/16S331J RS1/16S123J RS1/16S102J RS1/16S221J RS1/10S391J RS1/16S183J RS1/16S683J RS1/16S392J RS1/16S333J RS1/16S104J RS1/16S124J RS1/16S273J RS1/16S0R0J

====Circuit Symbol & No. Part Name=====	Part No.	====Circuit Symbol & No. Part Name=====	Part No.
R 127 153	RS1/16S222J	C 207	CCSRCH680J50
R 128	RS1/16S103J	C 208	CKSRYB223K25
R 129	RS1/16S184J	C 210	CKSQYB103K50
R 137	RS1/16S223J	C 211 235	CEVR47M50
R 142	RS1/16S473J	C 213	CCSQCH330J50
R 143	RS1/16S393J	C 215	CKSRYF473Z25
R 145	RS1/16S0R0J	C 220	CCSRCH430J50
R 148	RS1/10S222J	C 224 229	CEV470M16
R 151 152	RS1/16S222J	C 225	CKSQYB333K25
R 201	RS1/16S220J	C 226	CKSQYB473K25
R 202	RS1/10S681J	C 231	CCSRCH100D50
R 203	RS1/16S222J	C 232 234 244	CKSRYB103K50
R 204	RS1/16S473J	C 233	CKSRYF473Z25
R 205 209	RS1/16S470J	C 236	CKSYB104K50
R 207	RS1/10S822J	C 237	CEV4R7M35
R 211 212 236 237 238	RS1/16S103J	C 238	CEV3R3M50
R 214	RS1/16S182J	C 239	CKSRYB223K25
R 231	RS1/16S823J	C 242	CCSRCH030C50
R 232	RS1/10S102J		
R 233	RS1/16S222J	Unit Number :	
R 235	RS1/16S104J	Unit Name :TunerAmp Unit	
R 239	RS1/16S392J		
R 240	RS1/16S473J	MISCELLANEOUS	
R 241 242	RS1/16S103J	IC 501	LC72140M
R 243	RS1/16S152J	IC 502(DEH-M990RDS)	CWV1034
R 244	RS1/16S242J	IC 551	PA3027A
R 249	RS1/16S225J	IC 701	CWV1035
		IC 702	UPC4570G
CAPACITORS		IC 751	PD4414C
C 1 111 125	CEV100M16	IC 752	M51955AFP
C 2 51 59	CKSRYF473Z25	IC 753	S-80736AN-DY
C 5	CKSQYB472K50	IC 851 852	NJM4558MD
C 52 53 61	CKSRYB223K25	IC 951	L780505
C 54	CCSQCH101J50		
C 56	CKSRYF104Z25	IC 952	TA8214K
C 57	CSZSR33M25	Q 501 512 513 762 763 854 951 957	2SD601A
C 58	CCSRCH070D50	Q 502(DEH-M990RDS)	UN2211
C 60	CEVNP100M10	Q 503 505	2SK208
C 62	CCSRPH820J50	Q 504 506 507 508 509	2SC2712
C 63	CCSRPH470J50	Q 509(DEH-M990RDS)	2SC2712
C 72 73 80 104	CKSRYB103K50	Q 510 511 756 757	2SD1781K
C 74 129 158	CKSRYF473Z25	Q 514	2SC3098
C 101	CKSRYB332K50	Q 751 758	DTA114EK
C 102	CKSRYB682K50	Q 752 761	2SA1162
C 103	CKSQYB272K50	Q 753	2SB709A
C 105 127	CEV4R7M35	Q 754 955 964 966 968 970 972	UN2211
C 106	CEVR47M50	Q 755 759 760 953 962 976	UN2211
C 107 108	CKSRYB222K50	Q 851 852 853 954 956 959	2SD601A
C 110	CKSYB224K25	Q 952 958 963 965 967 969 971	2SB1238
C 112	CKSYB473K50	Q 960 975	2SD1859
C 122	CKSYB104K50	Q 961	2SC3673
C 123	CKSYB103K50	Q 973	UN2111
C 124 132 153	CSZSR47M20	Q 974	UN2211
C 128	CKSRYB223K25	Q 977	DTA114EK
C 131	CCSRCH820J50	Q 978	2SD1944
C 151 152	CKSQYB393K25	D 501 505 506 766 975	MA151WK-MT
C 154 155 156	CEV3R3M50	D 502 503	MA3027H
C 157	CEV101M10	D 504(DEH-M990RDS)	HZS5LLA
C 201 216 241	CKSRYB103K50	D 751 752 753 754 759 760 761 762 763	MA153-MC
C 202 212	CKSRYB332K50	D 755 756 757 758	MA153-MC
C 203	CSZS3R3M10	D 764	MA151WA-MN
C 204	CKSQYB223K25	D 767 769	MA151K-MH
C 205 221	CCSRCH120J50	D 768	RB705D
C 206	CCSRCH560J50	D 851	MA151WA-MN

====Circuit Symbol & No. Part Name=====	Part No.	====Circuit Symbol & No. Part Name=====	Part No.
D 951 953 957 958	1SS133	R 758 764 765 766 767	RS1/10S682J
D 954	SM-3-02LF EA	R 770(DEH-M990RDS,DEH-M990DSP)	RS1/10S473J
D 955 964 966 969 973 974	ERA15-02VH	R 771(DEH-M970DSP)	RS1/10S0R0J
D 956	ERA15-10VH	R 772(DEH-M990RDS,DEH-M970DSP)	RS1/10S473J
D 959	RB100AVH	R 773(DEH-M990DSP)	RS1/10S0R0J
D 960	HZS4LLB	R 780	RS1/10S102J
D 961	MA3075H	R 784 785	RS1/10S332J
D 962	MA3200MH	R 787	RD1/4PS473JL
D 963	MA3091L	R 790	RS1/10S471J
D 965	RD8R2JSB1	R 791 793	RS1/10S471J
D 967 970	HZS7LA1	R 792 794	RS1/10S471J
D 968	HZS9LB3	R 798 799	RS1/10S561J
D 971	MA151WK-MT	R 800 801 859 860 869 870 955 956	RS1/10S223J
D 972	HZS9LC3	R 802 803	RS1/10S512J
L 501 Inductor	LCTB1R0K3216	R 804	RS1/10S560J
L 502 Inductor	LCTB1R0K2125	R 806	RS1/10S752J
L 503 504 751 753 Inductor	LAU1R5K	R 809	RS1/10S104J
L 752 Ferri-Inductor	LAU2R2M	R 853 854 863 864	RS1/10S103J
TC 755 Trimmer	CCL1017	R 857 858	RS1/10S202J
IB 551 552	CWW1338	R 865 866	RS1/10S821J
X 501 Crystal Resonator	CSS1030	R 952 963 967	RS1/10S473J
X 751 Crystal Resonator	CSS1023	R 953	RD1/4PS472JL
S 751 Switch	CSG1020	R 954 961 968	RS1/10S104J
VR 501(DEH-M990RDS) Semi-fixed 4.7kΩ	CCP1125	R 957	RS1/10S103J
EF 951	CCG1003	R 958 969 981 983 993	RS1/10S472J
BZ 751 Buzzer	CPV1010	R 959	RD1/4PS272JL
ZN 951 Surge Absorber	ERZ-C07DK220	R 960	RS1/10S472J
	CWE1278	R 966 971 972	RS1/10S473J
	CWE1280	R 970 978 980 982 984	RD1/4PS332JL
	(DEH-M990RDS) FM/AM Unit	R 973	RS1/10S332J
	(DEH-M990DSP,DEH-M970DSP)		
RESISTORS		R 974	RD1/4PS561JL
R 501 RS1/10S103J		R 975	RD1/4PS151JL
R 502 RS1/10S333J		R 976	RS1/10S103J
R 503 506 507 509 526 527 617 618 788	RS1/10S222J	R 977 979 991	RS1/10S472J
R 504 508 625 626	RS1/10S0R0J	R 985	RD1/4PS102JL
R 505 513 781 782 783 786 807 962 964 965	RS1/10S103J	R 987	RS1/10S563J
R 510 514 515 516 517 518 520 525 607	RS1/10S102J	R 988	RS1/10S100J
R 511 RS1/10S152J		R 989	RD1/4PS471JL
R 512 540 551 552 553 554 703 704 705 706	RS1/10S472J	R 992	RD1/4PS221JL
R 519 RS1/10S333J		R 994	RD1/4PS242JL
R 521 990 RS1/10S392J		R 995	RS1/10S221J
R 522 523 530 531 532 539 541 543 544 549	RS1/10S473J	R 996	RD1/4PS220JL
R 528 529 RS1/10S222J		CAPACITORS	
R 534(DEH-M990RDS) RS1/10S102J		C 501 504 505 525	CKSQYB223K50
R 536(DEH-M990RDS) RS1/10S151J		C 502	CCSQCH561J50
R 538(DEH-M990RDS) RS1/10S222J		C 506 510 515 528 705 706 756 757 961	CKSQYB103K50
R 542 605 606 RS1/10S223J		C 507	CKSQYB473K50
R 545 546 547 557 601 603 604 613 619	RS1/10S102J	C 508 519 521 522 707 708	CEA4R7M50LL
R 548(DEH-M990RDS) RS1/10S102J		C 509	CCH1005
R 550 615 616 752 755 759 769 778 810 811	RS1/10S473J	C 511 752 753 951 953 976 978	CKSQYB473K50
R 555 556 558 559 560 561 562 563 564 565	RS1/10S2R2J	C 512(DEH-M990RDS)	CEAR47M50LL
R 566 567 RS1/10S101J		C 513 516	CCSQCH270J50
R 568 855 856 RS1/10S821J		C 514	CFTNA474J50
R 569 RS1/10S182J		C 517(DEH-M990RDS)	CKSQYB103K50
R 570 RS1/10S331J		C 518(DEH-M990RDS)	CEA101M16LL
R 602 795 RS1/10S562J		C 519(DEH-M990RDS)	CEA4R7M50LL
R 608 614 621 622 789 805 812	RS1/10S102J	C 520(DEH-M990RDS)	CCSQCH101J50
R 611 612 867 868	RS1/10S202J	C 523	CEAR22M50LL
R 701 RS1/10S273J		C 526 527	CCSQCH101J50
R 702 RS1/10S273J		C 529 716 717 718 719	CKSQYB102K50
R 707 RS1/10S510J		C 551 552 554 555 751 758 765 769	CKSQYB102K50
R 708 RS1/10S510J		C 553	CEHAS100M35
R 750 RS1/10S150J		C 556	CCH1125
R 751 768 RS1/10S683J			
R 753 754 779 796 797 808 851 852 861 862	RS1/10S472J		
R 756 757 761 762 763 986	RS1/10S221J		

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====Circuit Symbol & No. Part Name=====

Part No.

R 380
R 381
R 382
R 601 602 603 604 605 607 610
R 606

RS1/16S104J
RS1/16S133J
RS1/16S133J
RS1/16S103J
RS1/16S224J

R 609
R 611 612 665
R 613
R 614
R 615

RS1/16S102J
RS1/16S102J
RS1/16S102J
RS1/16S472J
RS1/16S472J

R 616
R 617
R 618 619 620
R 652
R 654

RS1/16S102J
RS1/8S0R0J
RS1/8S102J
RS1/16S162J
RS1/16S162J

R 655
R 656
R 657
R 663
R 664 753 755

RS1/16S183J
RS1/16S362J
RS1/16S162J
RS1/10S181J
RS1/16S103J

R 669 797
R 670
R 676
R 679
R 684

RS1/16S103J
RS1/10S151J
RS1/16S683J
RS1/16S102J
RS1/16S102J

R 709 710
R 711 712 764
R 721
R 722
R 724

RS1/16S0R0J
RS1/16S102J
RS1/16S472J
RS1/16S162J
RS1/10S1R0J

R 725
R 726
R 727 728 732
R 734
R 738 798

RS1/16S472J
RS1/16S0R0J
RS1/16S0R0J
RS1/16S473J
RS1/16S0R0J

R 751
R 752
R 754 776
R 756 771 772 773
R 758

RS1/10S1R0J
RS1/16S183J
RS1/16S472J
RS1/16S222J
RS1/16S224J

R 765 793
R 766
R 767 768
R 769 770
R 775

RS1/16S102J
RS1/16S473J
RS1/16S224J
RS1/16S104J
RS1/16S104J

R 778
R 780
R 781 782
R 783 784 785 786 787
R 788

RS1/16S103J
RS1/16S104J
RS1/16S362J
RS1/16S681J
RS1/16S102J

R 791 792
R 794
R 799

RS1/8S391J
RS1/16S151J
RS1/10S1R5J

CAPACITORS

C 351
C 352
C 353
C 354 355
C 357 359 366

CEV470M16
CKSQYB104K25
CEV101M6R3
CSZSR4R7M10
CKSRYB102K50

C 358
C 360
C 361
C 601
C 603

CKSRYB331K50
CKSRYB271K50
CCSRCH220J50
CKSRYB222K50
CKSRYB331K50

====Circuit Symbol & No. Part Name=====

Part No.

C 604 606
C 605
C 607 654 759
C 608
C 609 610 761

CKSYB224K25
CKSYB103K25
CKSYB224K25
CSZS010M16
CEV100M16

C 611
C 652
C 653 220 μ F/10V
C 655
C 658 220 μ F/10V

CKSRYB103K25
CKSYB224K25
CCH1148
CKSRYB391K50
CCH1148

C 662
C 666
C 670
C 671
C 672

CEV101M10
CKSQYB102K50
CKSQYB273K50
CKSRYB103K25
CKSQYB333K25

C 716
C 730
C 751 752
C 753 754 755
C 756

CEV100M16
CCSRCH470J50
CCSRCH221J50
CCSRCH221J50
CKSRYB472K50

Unit Number :
Unit Name : Switch P.C.Board

D 1 2 3 4
M 1 Motor(Spindle)
M 2 Motor Unit(Carriage)
M 3 Motor Unit>Loading)
S 1 2 Switch(Home,Clamp)

BR4361F
CXM1058
CXA4649
CXA4267
CSN1012

Unit Number :
Unit Name : Detector P.C.Board

MISCELLANEOUS

P 1 2 3 4 Photo Transistor

PT4800

Miscellaneous Parts List

PU Unit

CGY1020

